

## Preventing and Treating Osteoporosis

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## Osteoporosis

- Bone disease that occurs when the body loses too much bone, makes too little bone, or both.
- Bones become weak and prone to fractures.
- One in two American women (and one in four men) over the age of 50 will break a bone due to osteoporosis in their lifetime.
- Fractures commonly occur in the hip, spine, or wrist. Height loss can occur from spine fractures.
- After a hip fracture 20% of adults die within 1 year, either from complications related to the fracture itself or from the surgery.
- Osteoporosis has no symptoms. It is diagnosed with a bone density scan (x-ray).



## Risk Factors for Osteoporosis

- Autoimmune conditions: Rheumatoid arthritis, Lupus, Multiple Sclerosis (MS), plus others
- Endocrine: Diabetes, Hyperparathyroidism, Hyperthyroidism (or excess thyroid hormone replacement), Cushing's syndrome (excess cortisol), Premature menopause, Estrogen deficiency causing irregular periods, Low testosterone in men
- Psychiatric: Depression, eating disorders
- Gastrointestinal: Celiac disease, Inflammatory bowel disease (Crohn's or Ulcerative Colitis), Bariatric/weight loss surgery
- Cancer: Breast or prostate cancer (medication effects)



## Risk Factors for Osteoporosis

- Hematologic: Thalassemia, Leukemia, Lymphoma, Multiple Myeloma, Sickle Cell disease
- Neurologic: Stroke, Parkinson's disease, Spinal cord injuries, others that limit mobility
- Conditions treated with steroids: COPD (emphysema), Organ transplants
- Others: Chronic kidney disease, AIDS/HIV, Liver disease, Sarcoidosis
- Medications: Proton pump inhibitors (PPI – Protonix, etc), Steroids, Thiazolidinediones (TZDs – Actos, Avandia for diabetes), Epilepsy meds, Depo-Provera, Aromatase inhibitors



## Risk Factors for Osteoporosis

- Genetics (Parent with a hip fracture doubles your risk of a hip fracture)
- Low Body Weight/BMI
- Lack of Calcium/Vitamin D intake throughout lifetime
- Smoking
- Excess alcohol

## Prevention

- Maintain a normal body weight
- Hormone replacement, if appropriate
  - women lose up to 20% of bone density in the 5-7 years after menopause; by age 80, women will have lost 33% of hip bone density
- Avoid excess animal protein, sodium, caffeine (avoid colas; less than 3 cups of coffee per day)
- Don't smoke
- Don't have more than 2 alcoholic beverages per day

## Prevention

### Nutrition:

- Magnesium: Spinach, beet greens, okra, tomatoes, artichokes, potatoes, raisins, collard greens
- Potassium: Tomatoes, raisins, potatoes, spinach, sweet potatoes, papaya, oranges, bananas, prunes
- Vitamin K: Kale, collard greens, spinach, mustard greens, turnip greens, brussels sprouts
- Vitamin C: Red and green peppers, oranges, grapefruits, broccoli, strawberries, papaya, pineapple, brussels sprouts

## Prevention

### Calcium/Vitamin D intake:

#### Women:

- age 50 and younger – 1,000 mg of Calcium from ALL sources daily; 400-800 units of Vitamin D daily
- age 51 and older – 1,200 mg of Calcium from all sources daily; 800-1,000 units of Vitamin D daily

#### Men:

- age 50 and younger – same
- age 51-70 – 1,000 mg of Calcium; 800-1,000 units of Vitamin D
- age 71 and older – 1,200 mg of Calcium; 800-1,000 units of Vitamin D

International Osteoporosis Foundation Dietary calcium calculator:  
[iofbonehealth.org/calcium-calculator](http://iofbonehealth.org/calcium-calculator)

## Prevention

- Dietary Calcium sources:
  - Dairy – milk, yogurt, cheese. Can add 1 Tbsp nonfat powdered milk to foods (50 mg)
  - Leafy greens/green veggies (collard greens, turnip greens, kale, okra, dandelion and mustard greens)
- Supplements:
  - Read label for elemental calcium
  - Look at serving size
  - Doses of 500-600 mg at a time
  - Drink extra water to avoid constipation
  - Ask pharmacist about interactions with other medications

## Prevention

### Vitamin D sources:

- Sunlight: Skin production varies with time of day, season, latitude, skin pigmentation, age (less effective Vitamin D production with increasing age)
- Food: Fatty fish (salmon, tuna); added to fortified foods
- Supplements:
  - Check other medications and supplements for Vitamin D
  - Full amount may be taken at once
  - Both Vitamin D2 (ergocalciferol) and Vitamin D3 (cholecalciferol) are good for bone health

## Prevention

- Physical activity for 2.5 hours per week
- High impact: Dancing, High impact aerobics, hiking, jogging/running, jumping rope, stair climbing, tennis
- Low impact: Elliptical trainer, low impact aerobics, stair-stepping machines, walking
- Muscle strengthening: Lifting weights, resistance bands, Yoga, Pilates

## Prevention

- Prevent Falls (occur in 33% of adults over 65)
  - Correct eyesight problems (check glasses prescription)
  - Avoid sedating medications or medications that cause dizziness
  - Treat balance problems (physical therapy)
  - Safety proof your home (grab bars in bathrooms, get rid of tripping hazards like rugs, brighter light bulbs)
  - Low heeled shoes with rubber soles
  - Take care on slippery surfaces
  - Assistive devices for bending/reaching/walking

## Medication Options

### Anti-Resorptive vs. Anabolic

Decreases bone loss (osteoclasts) vs. Increases bone formation (osteoblasts)

## Anti-Resorptives

### Bisphosphonates:

Alendronate (Fosamax, Binosto) – oral pill given daily, weekly

- Typically given for 5 years, then 2 year “drug holiday”
- Approved for prevention & treatment, in men & women and for steroid-induced osteoporosis
- Decreases risk of spine & non-spine fractures (70% risk reduction)

## Anti-Resorptives

### Bisphosphonates:

Ibandronate (Boniva) – oral pill given monthly (prevention) or IV injection every 3 months (treatment)

- Decreases risk of spine fractures
- Must confirm normal kidney function

## Anti-Resorptives

### Bisphosphonates:

Risedronate (Actonel, Atelvia) – oral pill given daily, weekly, monthly

- Approved for prevention and treatment of osteoporosis in men & women & steroid-induced
- Decreases risk of spine & non-spine fractures

## Anti-Resorptives

### Bisphosphonates:

Zoledronic acid (Reclast) – IV annual dose

- Approved for prevention & treatment in men & women & steroid-induced
- Decreases risk of spine & non-spine fractures
- Check bloodwork for kidney function prior to administration

## Anti-Resorptives

### RANK-Ligand inhibitors:

Denosumab (Prolia) – Injection every 6 months

- Approved for treatment of osteoporosis; for prevention in men on prostate cancer treatments and women on breast cancer treatment at high risk for fractures; steroid-induced
- Continued indefinitely, no drug holiday because effects wear off after 6 months
- Decreases risk of spine & non-spine fractures

## Anti-Resorptives

Calcitonin (Miacalcin) – synthetic version of a naturally occurring hormone

- Decreases risk of spine fractures only

## Anti-Resorptives

### Selective Estrogen Receptor Modulator (SERM):

Raloxifene (Evista) – oral pill given daily

- Approved for prevention & treatment of osteoporosis
- Decreases risk of spine fractures only
- Decreases breast cancer risk but increases risk of stroke, blood clots

## Anti-Resorptives

### Tissue Specific Estrogen Complex:

Estrogen-Bazodoxifene (Duavee) – pill given daily

- Approved for prevention & treatment of osteoporosis for women after menopause
- Decreases risk of spine & hip fractures

## Anabolic agents

### Parathyroid Hormone Analog:

Teriparatide (Forteo) – daily injection given for 2 years only

- Decreases risk of spine & non-spine fractures
- Approved for women, men & steroid-induced
- Treatment course should be followed by an anti-resorptive medication to preserve the gain in bone density
- Not approved for Paget's disease, children, radiation treatment to the spine, hyperparathyroidism/hypercalcemia

## Anabolic agents

### Parathyroid hormone related-peptide analog:

Abaloparatide (Tymlos) – daily injection given for 18 months

- Same contraindications as Forteo
- Decreases risk of spine & non-spine fractures

## Thank you!

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