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)
• 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

**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*
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)

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)

- Ibandronate (Boniva) – oral pill given monthly (prevention) or IV injection every 3 months (treatment)
  - Decreases risk of spine fractures
  - Must confirm normal kidney function

- 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

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

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

• Decreases risk of spine fractures only

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-Bazedoxifene (Duavee) – pill given daily
• Approved for prevention & treatment of osteoporosis for women after menopause
• Decreases risk of spine & hip fractures

Anti-Resorptives

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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