Strategies to Prevent Bone Loss & Osteoporosis

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Disclosures

• None
What is osteoporosis?

“It’s what my doctor was testing for on the DXA machine.”
What is osteoporosis?

- Bone deficiency
- Bone thinning
- Bone loss
- Bone **weakening**
Why do we care about osteoporosis?

The classic story about the little old lady who falls and breaks her hip…
Dismal statistics…

• 8 million women in the US have osteoporosis
• 50% of all women will have a fracture in her lifetime
• 25% of women will die in the first year following hip fracture
• $25 billion dollars: estimated total cost of fractures by 2025
Today’s goals

1. What can you do to maintain your bone strength and prevent osteoporosis?
2. What specific treatments are there for osteoporosis? (What can your doctor do?)
3. What are some of the “hot topics” in osteoporosis treatment today?
A mini lesson on bone...

- Bone is not an inanimate object!
  - Building up
  - Breaking down
  - Renewal, flexibility, healing

- Balance of bone building up (↑) and breaking down (↓) determines total bone density
Bone density and age

Bone Density

30 years

50-55 years

Age
Who is at risk for osteoporosis?

- **Age** (post-menopause)
- Family history and race
- Medications (steroids)
- Low body weight*
- Inactivity*
- Alcohol, tobacco*
- Vitamin and mineral deficiency*
How can we maintain and strengthen our bones?

• Calcium
  – Goals:
    • ≤ 50 years, 1000 mg per day*
    • 51+ years, 1200 mg per day
  – Food sources:
    • Dairy products, fortified foods
  – Supplements?
    • Calcium citrate versus calcium carbonate?
    • No more than 600 mg at once!
How can we maintain and strengthen our bones?

• Vitamin D
  – Goals:
    • \( \leq 70 \text{ years}, 600 \text{ IU per day}^* \)
    • 71+ years, 800 IU per day
  – Natural and food sources?
    • Sunlight exposure
    • Fatty fish, fortified foods
  – Supplements?
    • Can be taken all at once (D3)

IOM 2011, USPSTF Final Recommendations 2013
How can we maintain and strengthen our bones?

• Protein
  – Goals: 0.4 grams / pound body weight
    (140lb woman, approximately 60g protein daily)
  – Food sources: meat, eggs, tofu, beans

• Exercise (resistance)
  – Goals: 30 minutes, 3 – 4 days per week
  – Examples:
    • Walking!
    • Free weights, aerobics, resistance bands, etc.
How can we maintain and strengthen our bones?

- Quit smoking
- Limit alcohol consumption
- Maintain a healthy weight
- Eat a well-balanced diet
Other strategies

What happens when diet and lifestyle aren’t enough to prevent bone loss or fracture?
Medical treatments for osteoporosis

• To be taken in addition to calcium and vitamin D!!!

• Categories of medications:
  – Reduce bone breakdown
  – Increase bone building

• Goal of treatment: fracture prevention
  – DXA scan results may not change
Medications to slow bone breakdown

• Estrogen
  – Controversy of 2002 Women’s Health Initiative
  – Current recommendations

• Selective Estrogen Receptor Modulators (SERMs)
  – Raloxifene (Evista®), tamoxifen
  – Daily pill
  – No hip fracture prevention, + clotting risk, hot flashes
Medications to slow bone breakdown

• Bisphosphonates, oral forms
  – Alendronate (Fosamax®, Fosavance®)
    • Weekly pill
  – Risedronate (Actonel®)
    • Weekly or monthly pill
  – Ibandronate (Boniva®)
    • Monthly pill
    • No hip fracture prevention!
Medications to slow bone breakdown

• Bisphosphonates, IV forms
  – Zoledronic acid (Reclast®)

• Candidates for IV zoledronic acid
  – Difficulty swallowing, reflux disease
  – Poor absorption of oral bisphosphonates?

• Side effects of bisphosphonates
  – Bone pain, low blood calcium, infusion reaction*, jaw erosion, atypical fractures (?)
Medications to slow bone breakdown

• RANK ligand inhibitor
  – Denosumab (Prolia®)
  – Subcutaneous injection every 6 months
  – Bone pain, low blood calcium, jaw erosion, infection, atypical fractures (?)

• Strontium?

• Keep an eye out for…
  – Cathepsin K inhibitors
Medication to increase bone building

• Teriparatide (Forteo®)
  – Once daily subcutaneous injection
  – Use for 2 years maximum, then must be put back on an anti-resorptive medication
  – Side effects: high blood calcium; bone and muscle pain
  – Candidates for treatment?

• On the horizon… sclerostin antibodies
The controversies... some of them, at least...

But what about that story I heard on the news / read in the paper / my friend told me about???
Controversies

1. Calcium and heart health
2. Jaw osteonecrosis and bisphosphonates
3. Atypical fractures and bisphosphonates
Controversy: Calcium and heart health

• The headlines: “Calcium supplements linked to heart attacks.”

• The studies:
  – Designed to look for other outcomes (colon cancer, hypertension)
  – No effect on stroke or total heart disease
  – Not designed to look for the specific effect of calcium on heart health
Controversy: Calcium and heart health

• Consensus:
  – Studies needed designed to look for specific effects of calcium on the heart

• What we do about it as physicians:
  – Calcium per recommendations (1000 - 1200 mg daily)
  – Risks and benefits (fracture risk versus cardiovascular risk?)
Controversy: Osteonecrosis of the jaw and bisphosphonates

• What is osteonecrosis of the jaw (ONJ)?
  – Exposure and erosion of bone along jawline inside of the mouth

• Frequency among bisphosphonate (for osteoporosis) users:
  – Approximately 1 case per 100,000 people per year
Controversy: Osteonecrosis of the jaw and bisphosphonates

• Risks for ONJ:
  – High dose, frequent IV administration (breast cancer, multiple myeloma)
  – Invasive dental procedures (tooth extractions, implants, root canals)

• What we do about it as physicians:
  – Hold bisphosphonate 2 months before and 2 months after invasive dental procedure
Controversy: Atypical hip fractures and bisphosphonates

- What is an atypical hip fracture?
- The concern:
  - Long-term bisphosphonate use
  - "Frozen bones"
- What the studies show:
  - People being treated for osteoporosis get atypical fractures, but…
Controversy: Atypical hip fractures and bisphosphonates

• Conclusions:
  – No clear evidence that bisphosphonates cause atypical fractures.

• What we do about it as physicians:
  – Weigh the risks and benefits
  – Drug holidays for the right patients
Summary: Maintaining and treating bone strength

• Calcium, vitamin D and exercise!
• Identify your risk factors for bone loss (and modify them, if possible!)
• Talk with your doctor about the results of your bone density testing
Summary: Maintaining and treating bone strength

• Some women *may* need medical treatment for their bones
• Treatment type and duration depends on the patient
• Take what you hear from the media with a grain of salt …
How do I know if I need additional evaluation?

1. If your bone density testing keeps getting worse over time
2. If you have broken a bone since the peri-menopause … fractures are not “normal” with age!
3. If you have been on long-term therapy and wonder if it might be time for a “holiday”
Questions?

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