Your Bones and You

This handout is about osteoporosis or "thinning" of the bones.

The problem isn't bone thinning! The problem is fractures. Breaking a hip can be life-threatening. Crushed spinal vertebrae can cause chronic pain. It's the fractures we want to prevent!

Osteoporosis ("OSS-tee-oh por-OH-sis") means "thin" or "porous" bones, that are easier to break or crush. Someone who has osteoporosis is **five times more likely to break a bone** than someone who does not. About 7% of older white women may have osteoporosis.
Osteopenia ("OSS-tee-oh PEEN-ee-a") means "poverty of the bones." It's when the bones are just starting to thin. Someone with osteopenia may have **double the risk of a broken bone**. About 40% of older white women have osteopenia.
Older men, people on bone-thinning meds, and those who are malnourished or unable to exercise, get thinning of the bones, too.

How can you prevent thinning of the bones?
Start when you are young, if you can. If you can't start young, start now! Please discuss these with your doctor and make a concrete, realistic plan that you will follow.

- ***Weight-bearing exercise*** makes the bones stronger. If your muscles don't allow weightlifting or weight-machine exercise, start in a swimming pool, where water resistance and buoyancy will help build muscle.
- ***Appropriate hormone therapy*** can help you maintain bone and muscle mass. Topical hormones (patch or cream) are safest, and a little goes a long way.
- ***Bisphosphonates*** are a last resort for people who have severe osteoporosis with a high risk of fractures. We are not certain whether they are significantly helpful. For most people, the risk of fracture is low, and lowering it with a bisphosphonate may not as much difference as preventing problems.
- ***Calcium and vitamin D.*** See http://bit.ly/umr04Q for guidelines about how much vitamin D and calcium you need as an individual.
- ***Foods and supplements*** can make you lose calcium, from your blood and bones - for example, aluminum-containing antacids, carbonated beverages, caffeine, high-protein diets.
- ***Medications matter***. Steroids (prednisone, oral hydrocortisone/Cortef) can thin the bones. Loop diuretics (like furosemide/Lasix) lower blood calcium, and thiazide diuretics (like HCTZ or chlorthalidone) increase blood calcium.
- ***Stress reduction:*** People who are on "red alert" every day may have higher levels of stress hormones in the body, which can interact with other conditions to thin the bones. Meditation and prayer, as well as creative work (arts and music) and warm-water exercise, may reduce these chronic stress hormones.

How can you determine your risk?
The FRAX tool was developed by the World Health Organization. It is a way of adding up your risk factors to determine your risk of a major fracture due to thin bones (spine, arm, etc.), as well as the specific risk of a broken hip in the next 10 years. For example, a 10% risk means that, out of ten people who are exactly like you, one will break a bone in the next ten years.
You can find a calculator to determine your risk at http://www.shef.ac.uk/FRAX/
You will notice that the values you enter are in the metric system, but there are converters at the side of the page. It's okay if you do noit know your DEXA score (see below).

Testing for bone density
The differences between normal, osteopenia, and osteoporosis are technical ones, based on bone density testing. The usual test is a "DEXA" x-ray scan of the spine and hip. The result you get from a DEXA is a "T-score." (A T-score is like a standard deviation.)

- Normal: T-score 0 to -1. (Established for a healthy 30-year-old male.)
- Osteopenia: T-score -1 to -2.5.
- Osteoporosis: T-score more than -2.5 (example, -3, -3.5, etc.)

The World Health Organization has developed definitions for low bone mass (osteopenia) and osteoporosis. These definitions are based on a T-score. The T-score is a measure of how dense a patient's bone is compared to a normal, healthy 30-year-old adult.

Who should talk with their doctor about whether to get a DEXA scan?

- Women over age 65
- Women under 65 who had their menopause (natural or surgical) 10-15 years previously
- Men under 65 who had orchiectomy for testicular or prostate cancer in the past
- People with risks for fractures:
  - ~ underweight
  - ~ cigarette smoking
  - ~ taking long-term steroid medications, chemotherapy, dialysis
  - ~ family history of osteoporosis or fractures in old age (close blood relatives only)
  - ~ previous fractures - broken hip, broken ribs from coughing, broken wrist from falling, vertebral compression fractures

What if you are taking a bisphosphonate for osteoporosis?

- Some doctors recommend DEXA scanning every 1-2 years, to monitor improvement in bone density during treatment. But this is controversial for the following, somewhat confusing, reasons:
- Bone density changes very slowly, only about 1% per year. The rate of error for the DEXA machine is around 3%. Therefore, DEXA scans can't tell the difference between improved bone density and a machine error, if you repeat the scan every year or two.
- Improved bone density on a DEXA does not correlate with lower risk of broken bones.
- Also, bone-building medications lower risk of fracture, even if the DEXA score does not change.
- Even if the bones look worse on DEXA, changing medications or adding new medications has not been found to reduce risk of fractures.
- Bone density during treatment fluctuates. This does not indicate success or failure of treatment. The reduced number or severity of fractures is the only indication that treatment is successful.

Take-home message: Avoid false positives by not getting scanned too often. Discuss it with your doctor.

Sample prevention plan:

For a 55 year old female nonsmoker in good health, who works indoors. She takes thyroid medicine (levothyroxine) and is a vegetarian. She has not had a bone scan. Her mother had a broken hip due to osteoporosis last year. Her FRAX risk of a major osteoporotic fracture in the next 10 years is 11%, and her risk of hip fracture during that time is only 0.4%.

Monday
Walk outside after supper
Calcium (Tums 500), one tablet with breakfast and supper
Vitamin D, 1000 units with breakfast and supper
Triple hormone cream, applied to skin once a day (estradiol + progesterone + testosterone)
Thyroid medicine at bedtime (so it doesn't interact with calcium)

Tuesday
Pool exercise (gentle water aerobics)
Calcium (Tums 500), vitamin D twice a day
Triple hormone cream once a day
Thyroid medicine at bedtime

Wednesday
Walk outside after supper
Calcium (Tums 500), vitamin D twice a day
Triple hormone cream once a day
Thyroid medicine at bedtime

Thursday
Pool exercise
Calcium (Tums 500), vitamin D twice a day
Triple hormone cream once a day
Thyroid medicine at bedtime

Friday
Walk outside after supper
Calcium (Tums 500), vitamin D twice a day
Triple hormone cream once a day
Thyroid medicine at bedtime

Saturday
Weight machine routine at the gym
Calcium (Tums 500), vitamin D twice a day
Triple hormone cream once a day
Thyroid medicine at bedtime

Sunday
T'ai chi group in the morning
Walk outside after supper
Calcium (Tums 500), vitamin D twice a day
Triple hormone cream once a day
Thyroid medicine at bedtime

Future:
~ Work up to weight lifting three times weekly and walking every day.
~ Continue pool exercise and t'ai chi. Add meditation, prayer, and/or arts and music, for stress reduction.
~ Switch to low-dose estrogen cream around age 60-65, after menopausal symptoms are past.
~ Continue a healthy diet with appropriate supplements.

Updated 11/2011 by Leigh Saint-Louis MD