

Osteoporosis Update

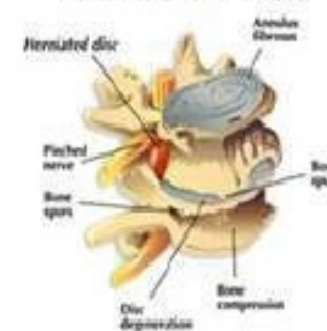
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Associate Professor of Medicine
Upstate Medical University
Director of the Bone Density Unit
Joslin Center Syracuse

Osteoporosis

- **Osteoporosis** is a systemic skeletal disease characterized by low bone density and microarchitectural deterioration of bone tissue with a consequent increase in **bone fragility**



Advanced Osteoporosis

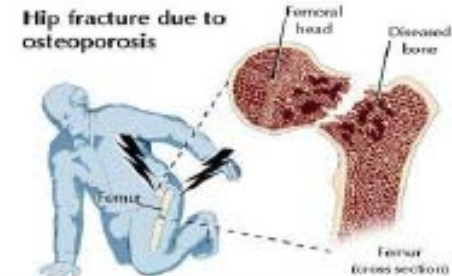


Incidence

- Osteoporosis is three times (**3 X**) more common in **women** than in men, partly because women have a **lower peak bone mass** and partly because of the **hormonal changes** that occur at the menopause

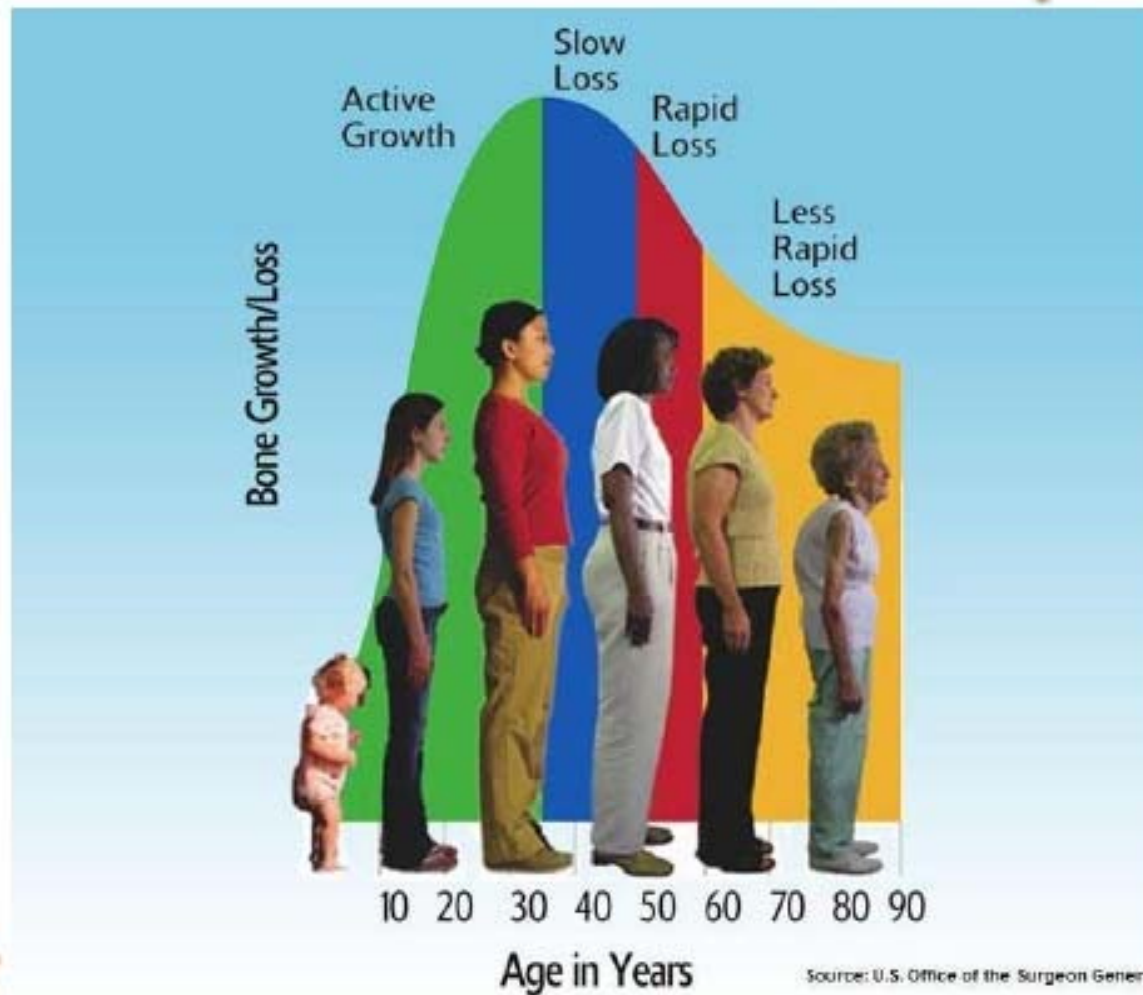


Incidence



- In addition, women live longer than men and therefore have greater reductions in bone mass
- In osteoporosis, the morbidity of the disease arises from the associated fractures
- The pathogenesis of fractures depends on many factors other than osteoporosis

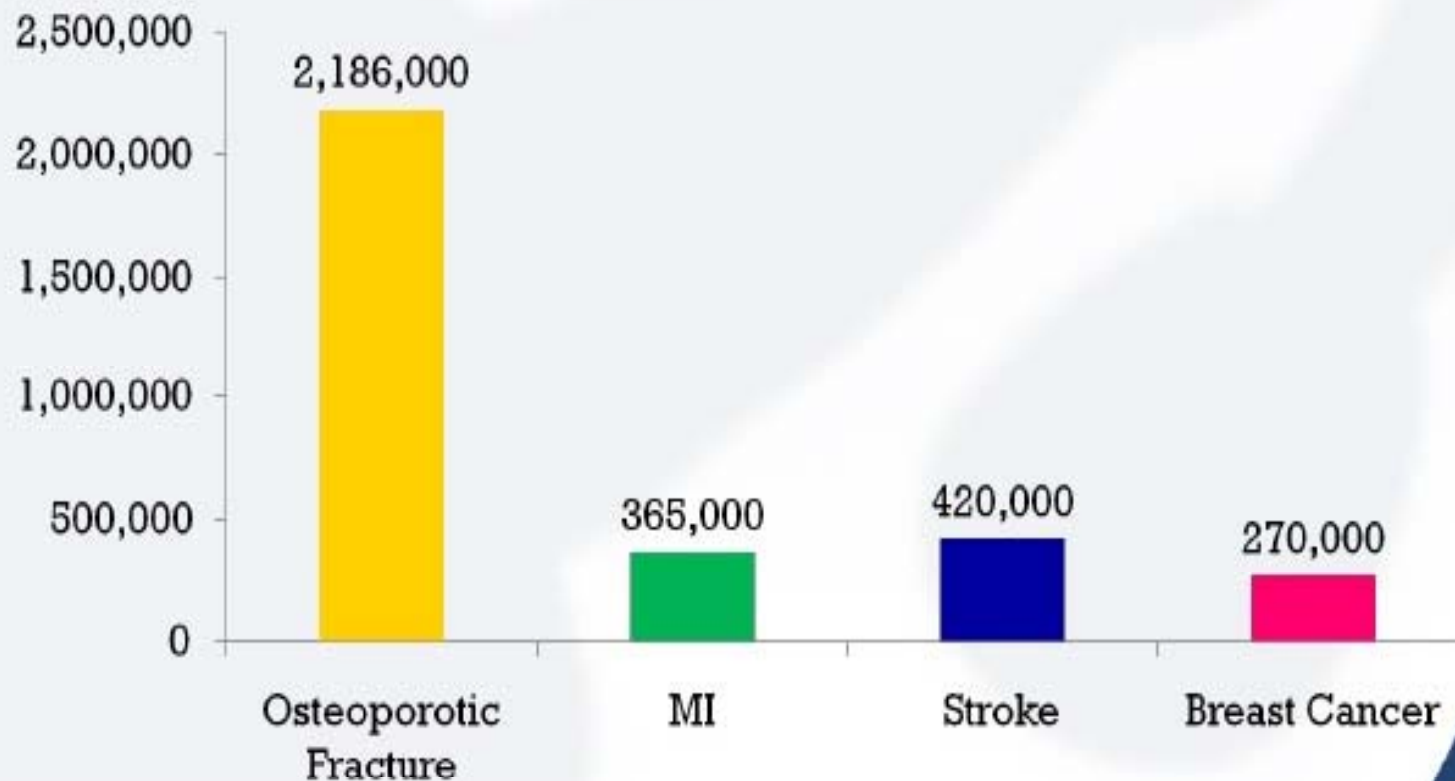
Osteoporosis



Losing bone with years



Incidence of Disease in US Women



Derived from data received from the NOF, AHA, and the ACA



DXA Screening

- Women over age 65 and men over 70.
- Any person over age 50 with risk factors or suspicious fracture.
- Younger person with risk factors or atypical fractures.
- Chronic steroid use, prednisone 5 mg or more daily for at least 3 months.

Diagnosis

Bone mineral density (BMD) tests can measure bone density in various sites of the body.

- **BMD test is done to diagnose and predict fracture risk and to monitor therapy.**
- For patients on pharmacotherapy, it is typically performed 2 years after initiating therapy and every 2 years thereafter; however, more frequent testing may be warranted in certain clinical situations.



Diagnosis...

- Dual-energy X-ray Absorptiometry (DXA) Scan

Classification	T-score
Normal	-1 or greater
Osteopenia	Between -1 and -2.5
Osteoporosis	-2.5 or less
Severe Osteoporosis	-2.5 or less and <i>fragility fracture</i>



Bone Density Report - Lumbar Spine

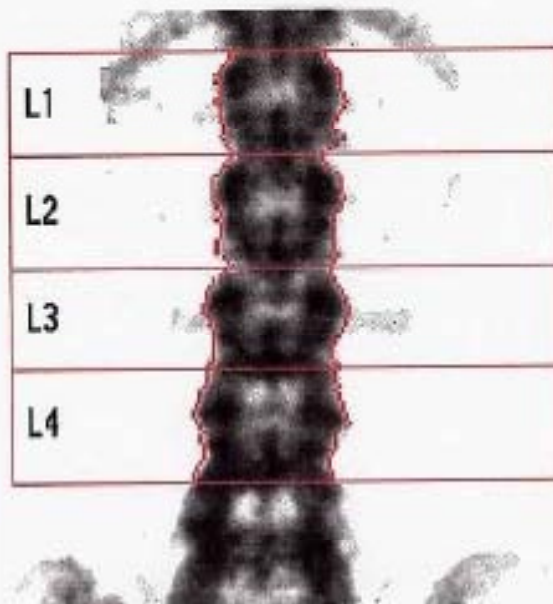


AP SPINE RESULTS
 SPRINGFIELD CLINIC
 1025 S. SEVENTH ST., SPRINGFIELD, IL 62703

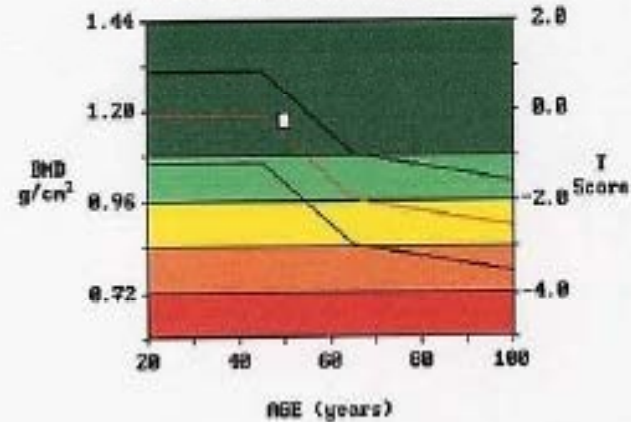
Facility: [Redacted]
 50 years 03/05/1952
 62 in 134 [Redacted] ale
 Physician: ZINZILIETA 9

AP SPINE BONE DENSITY

Acquired: 06/18/2002 (4.6e)
 Analyzed: 06/18/2002 (4.6e)
 Printed: 06/18/2002 (4.6e)
 jaacclj03.c72

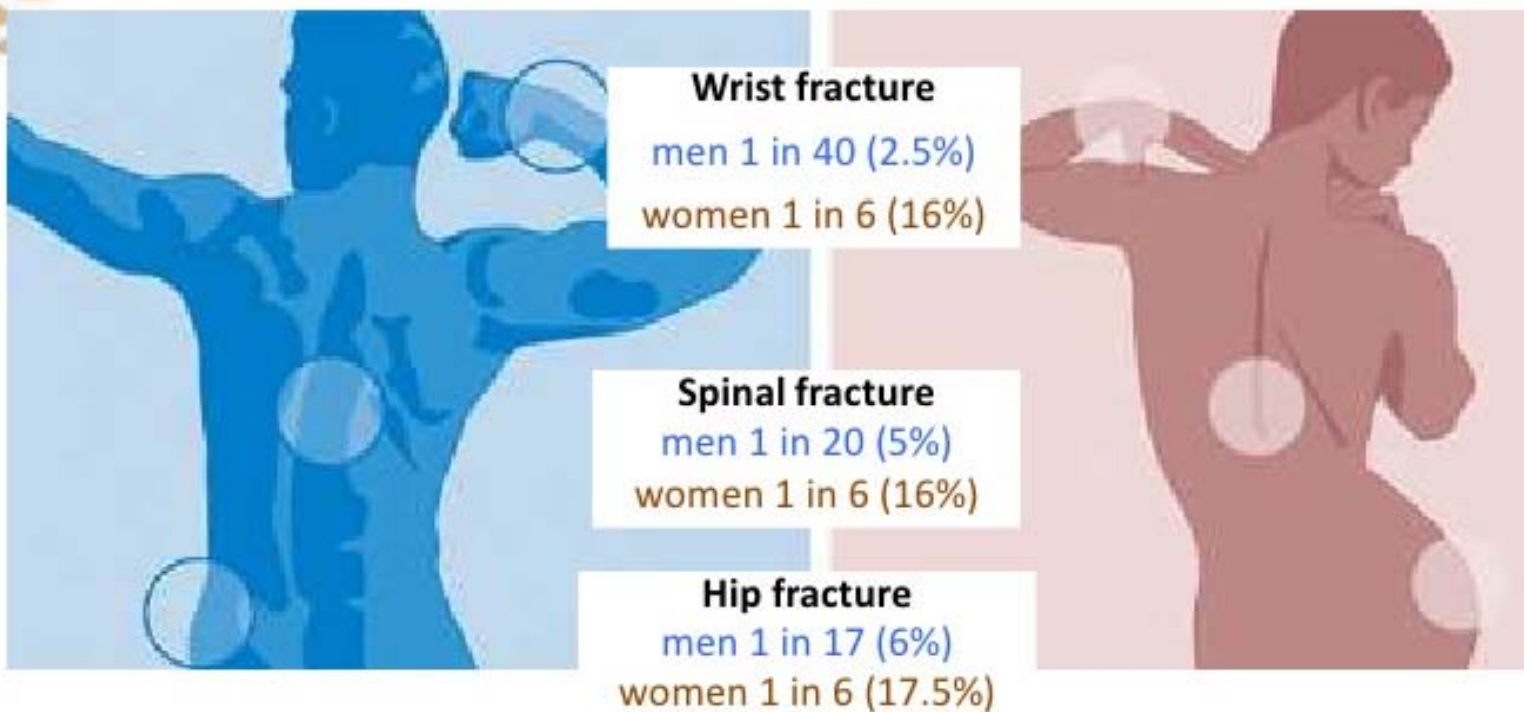


L2-L4 Comparison to Reference



Region	BMD ^{1,2} g/cm ²	Young-Adult ²		Age-Matched ³	
		%	T	%	Z
L1	1.030	91	-0.8	97	-0.2
L2	1.126	94	-0.6	100	0.0
L3	1.179	98	-0.2	104	0.4

Complications...

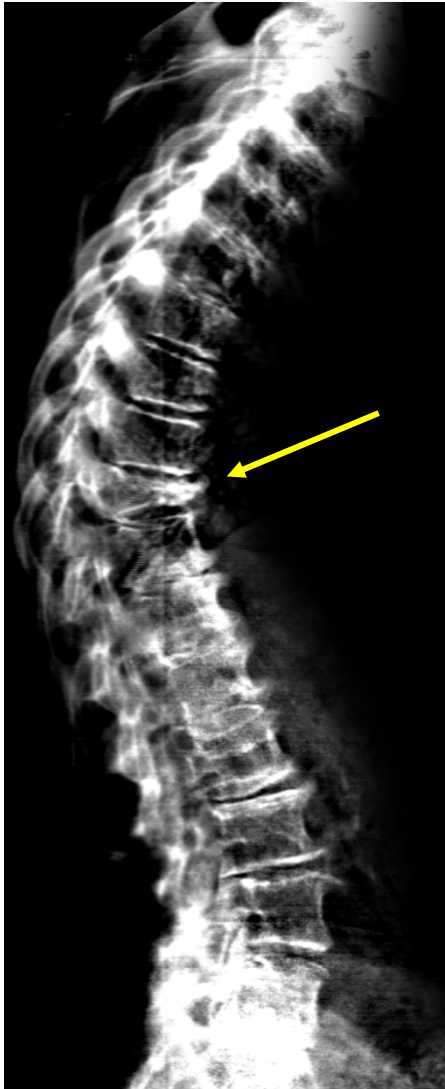


Osteoporosis Fracture

- The most serious osteoporotic fracture is that of the hip
- Hip fractures typically result from falls, but some occur spontaneously
- Women are more often affected than men and the incidence rates rise exponentially with age



Vertebral Fracture Assessment

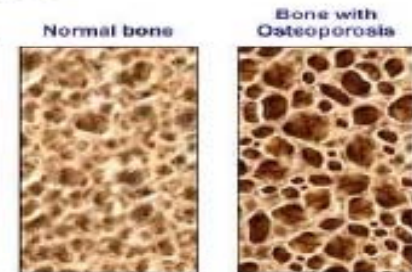


Osteoporosis Diagnosis: x-rays

- In severe cases, a **spine or hip x-ray** may show fracture or collapse of the spinal bones
- However, simple x-rays of bones are not very accurate in predicting whether someone is likely to have osteoporosis



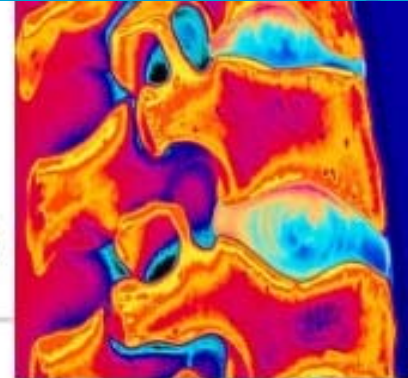
Causes of Osteoporosis



- **Low calcium diet**
- **Lack of physical activity**
- **Family History:** If someone in your family has or had osteoporosis, you're more at risk
- **Gender:** Women are simply more likely to develop osteoporosis
- **Ethnicity:** White and Asian people are more likely to be affected by osteoporosis



Causes of Osteoporosis



- Glucocorticoid medications (ex cortisone, prednisone)
- Hypogonadism (low testosterone levels)
- Excessive alcohol consumption
- Smoking
- Chronic obstructive pulmonary disease (COPD) and asthma
- Gastrointestinal disease – malabsorption, prolonged use of PPI's

Help Prevent Osteoporosis



- Prevent fractures
- Maintain bone mass
 - Good nutrition
 - Adequate calcium and Vitamin D
 - Encourage weight bearing exercise
 - Avoid smoking
- Even though you do all these, you can still develop osteoporosis

Weight Bearing Exercise

- Exercise that forces your body to support your full weight.
- 20-30 minutes at least five times a week
- *Examples*
 - Walking
 - Climbing stairs
 - Tennis
 - Dancing
 - Jogging
 - Climbing stairs
- Before starting any exercise you should consult with your physician.



Exercise for Strength and Balance

- Goal: decrease the risk of falling
- No proven effect on bone mass
- *Examples:*
 - Swimming
 - Bike riding
 - Rowing
 - Weight lifting
- Before starting any exercise you should consult with your physician.



A graphic of a stethoscope is positioned in the upper right corner of the slide, partially overlapping the blue header and the white content area.

How Much Calcium is Enough?

- Varies for age
 - 1,200 mg every day after age 50
- From diet or supplement or both

Good Sources of Calcium

- Milk-300 mg/glass (4 glasses per day)
- Yogurt-400 mg/cup (3 cups per day)
- Broccoli-172 mg/cup (7+ cups per day)

Treatment



High-calcium foods include:

- Cheese
- Ice cream
- Leafy green vegetables, such as spinach and collard greens
- Low-fat milk
- Salmon
- Sardines (with the bones)
- Tofu
- Yogurt



How Much Vitamin D Should I Get?



- 800 IU every day
- From fortified foods or supplements or both

Good sources of Vitamin D

- Milk (100 IU per glass)
- Supplements with calcium (most have 800 IU)

Treatment

High-vitamin D foods:

- **Fish oil, cod liver:** Vitamin D 2217 IU
- **Fish herring, Atlantic raw:** Vit D 2061 IU
- **Fish catfish, wild raw:** Vit D 1053 IU
- **Mollusks, oysters raw:** Vit D 941 IU
- **Fish salmon sockeye:** Vit D 920 IU
- **Fish salmon pink:** Vit D 898 IU





Calcium Supplements

- Better to not exceed 2000 mg daily from all sources.
- Ca Carbonate requires acid in stomach to be absorbed, Ca Citrate does not.
- A person typically can absorb just 500-600 mg of calcium at one time (? Citracal 1200 extended release)
- It is difficult to take too much Vitamin D. Experts recommend up to 4000-6000 units daily safely.



Treatment



STOP UNHEALTHY HABITS

- Limit alcohol intake
- Too much alcohol can damage your bones, as well as put you at risk for falling and breaking a bone
- Quit smoking, if you smoke





Treatment

PREVENT FALLS

- Avoid sedating medications
- Remove household hazards to reduce the risk of fractures
- Make sure your vision is good





Prevent Falls



Other ways to prevent falling include:

- Avoiding walking alone on icy days
- Using bars in the bathtub, when needed
- Wearing well-fitting shoes



Treatment



Medications are used to strengthen bones when:

- **Osteoporosis** has been diagnosed by a bone density study (DEXA)
- **Osteopenia** (thin bones, but not osteoporosis) has been diagnosed by a bone density study, if a bone fracture has occurred

Treatment



BISPHOSPHONATES

- Bisphosphonates are the primary drugs used to both prevent and treat osteoporosis in postmenopausal women
- Bisphosphonates taken by mouth include Alendronate (**Fosamax**), Ibandronate (**Boniva**), and Risedronate (**Actonel**)
- Most are taken by mouth, usually once a week or once a month



Treatment


Reclast[®]
(zoledronic acid) injection
5 mg/100 mL for infusion

- A novel approach for the treatment of osteoporosis has just been approved by the FDA: **Reclast (Zoledronic acid)**
- This IV medication is a **once a year, 15 minute infusion**, which will allow the easiest available intake of an osteoporosis medication, with excellent efficacy, and a good safety profile
- Serum creatinine (renal function) should be measured before each Reclast dose

Treatment



PARATHYROID HORMONE

- **Teriparatide (Forteo)** is approved for the treatment of postmenopausal women who have **severe osteoporosis** and are considered at high risk for fractures
- The medicine is given through daily shots underneath the skin. You can give yourself the shots at home



Treatment

EVISTA
raloxifene HCl
tablets 60mg

*Protect her bones.
Protect her breasts.*

RALOXIFENE

- Raloxifene (**Evista**) is used for the prevention and treatment of osteoporosis.
- Raloxifene is similar to the breast cancer drug tamoxifen
- Raloxifene can reduce the risk of spinal fractures by almost 50%. However, it does not appear to prevent other fractures, including those in the hip



Treatment

EVISTA
raloxifene HCl
tablets 60mg

*Protect her bones.
Protect her breasts.*

RALOXIFENE

- It may have protective effects against heart disease and breast cancer, though more studies are needed
- The most serious side effect of raloxifene is a very small risk of blood clots in the leg veins (deep venous thrombosis) or in the lungs (pulmonary embolus)

Prolia every 6 months



Denosumab (Prolia)

- RANKL inhibitor, anti-resorptive.
- Given SQ 60 mg every 6 months in office.
- FDA approved in 2010 but Amgen has 8 years of data.
- DXAs improve well, generally well tolerated.
- Can be given at lower kidney function.
- Side effects: skin rashes (seen first 3 yrs of study, not in last 5 years).



More Natural Approaches

- Stontium (the ranelate form is approved in multiple countries)
- In the US, most supplements are with citrate.
- Not FDA regulated here, cannot promise same efficacy.
- Vitamin Code Grow Bone system used by some.



What to expect on repeat DXA?

- An increase is preferred. Stability is OK also.
- A decrease, if significant, may prompt additional tests and/or questions about treatment.
- A considerable decrease may warrant a change in treatment.
- A fracture occurring may or may not signify a change in treatment.

Drug Holidays

- Can be considered after several years of meds.
- If a drug holiday is considered in a low risk person, a minimum duration of 5 years of alendronate use seems reasonable or 3 years of zolendronic acid.
- Drug holidays not feasible for teriparatide or denosumab as drug effect wears off.
- T-scores, any previous fractures, high risk medication use, other risk factors should be considered in determining a drug holiday.
- Could test DXA one year later to see if stable.

ONJ (osteonecrosis of the jaw)

- Extremely uncommon, some estimates are 1:100,000.
- Always weigh risks and benefits, discuss with your doctor.
- Discuss regular dental exams, surgeries.
- Could hold off on starting treatment if upcoming dental surgery planned.
- Some dentists request treatment to be held for procedure, no good data on this.

Atypical Fractures of the Femoral Diaphysis

- Several reports with long term (>5 yr) use of alendronate have been reported.
- The mechanism is unknown and these fractures have been seen in people never on treatment.
- Estimate about 1:10,000
- Some experts believe this may be another variant of an osteoporotic fracture.
- Only time and more careful reporting is needed.
- Risks and benefits should always be weighed.

There is no expiration date on bisphosphonates!

Take home points

- Osteoporosis is very common and fractures can be devastating.
- Most therapies are safe and effective, discuss any new dental issues, thigh or hip pain at visits.
- If on bisphosphonates over 3-5 years, reassess to see if a drug holiday or change in therapy is appropriate.
- Treatment vital after non traumatic hip fractures.
- Denosumab (Prolia) good alternative to bisphosphonates, Teriparatide (Forteo) to be considered as anabolic therapy.
- Very important to take the meds regularly and correctly along with calcium and vitamin D.



Thank you!!

Questions??