



Dr. Sandy [♥]
BEVACQUA

Natural Solutions to

Bone Health

Why Are Healthy Bones Important?

- **Bones are**
 - the framework for our muscles.
 - a storehouse for vital minerals needed to live.
 - protect the heart, lungs, brain, and other organs from injury.
- **Weak bones often result in painful and debilitating fractures.**
 - Each year, 1.5 million Americans suffer a fracture due to weak bones
 - “~75% of sig. falls end in undetected fractures”.
 - The most common breaks are of the wrist, spine, and hip.
 - Current stats tell us that of all 76 year old people, 1/3rd of women and 1/6th of men will have hip fractures.
 - Worldwide, osteoporosis causes more than 8.9 million fractures annually, resulting in an osteoporotic fracture every 3 seconds

What is Osteoporosis?

Osteoporosis: a condition in which bones become brittle and weak, causing them to break more easily than normal bone.

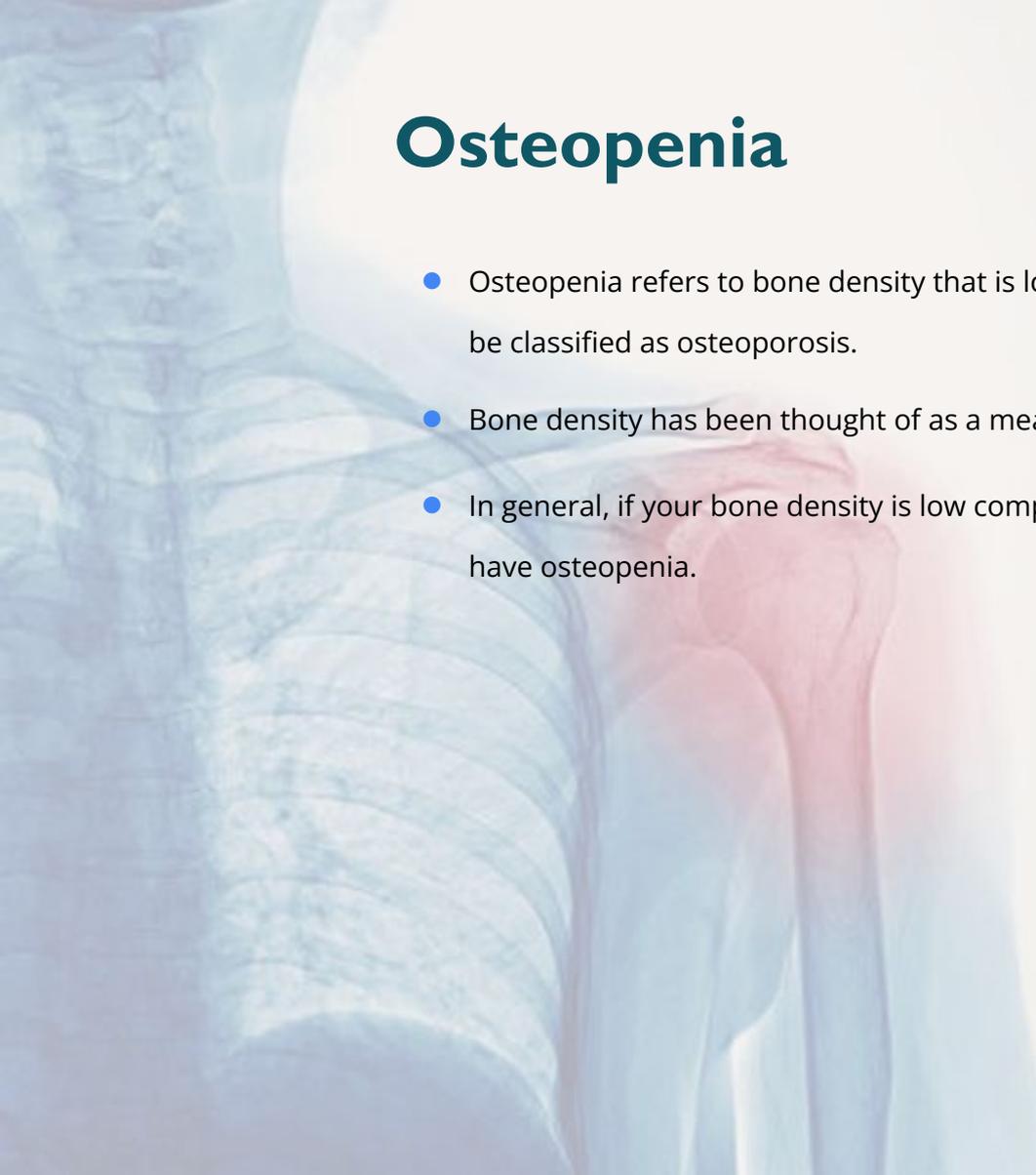
The two images below are a microscopic representation of a healthy bone and a bone that has osteoporosis



Normal bone
is dense and strong



Osteoporotic bone
is weak and can
easily fracture



Osteopenia

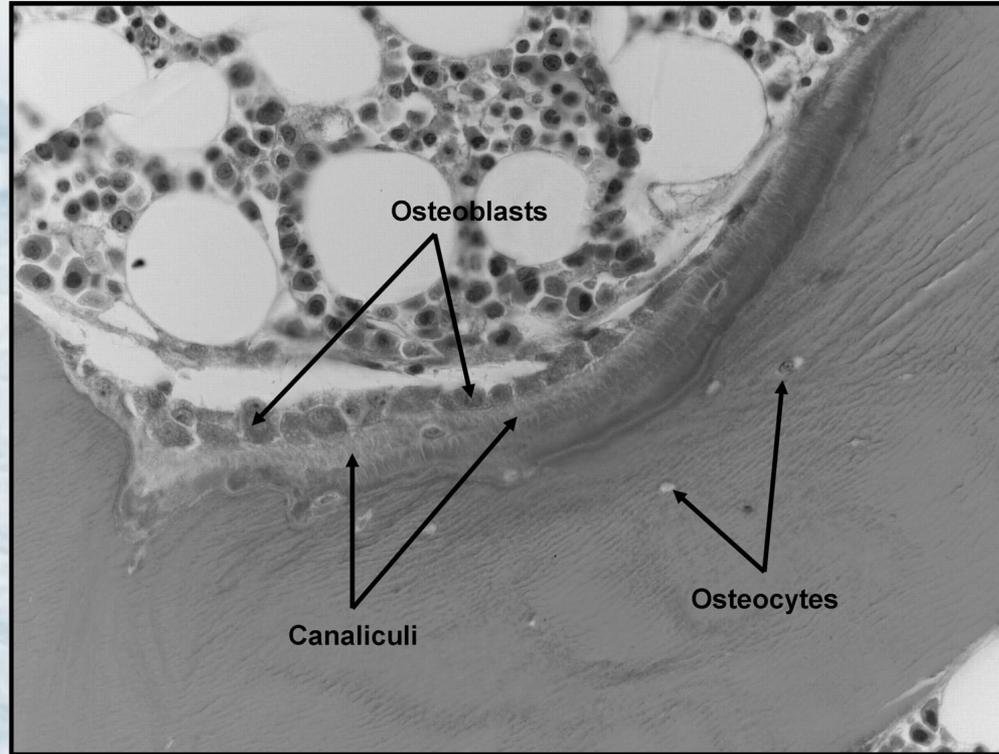
- Osteopenia refers to bone density that is lower than normal peak density but not low enough to be classified as osteoporosis.
- Bone density has been thought of as a measurement of how dense and strong the bones are.
- In general, if your bone density is low compared to normal peak density, you are said to have osteopenia.

Bone Formation

- Osteoclasts- remove old bone (clean-up crew)
- Osteoblasts- create collagen matrix (spiders)
- Calcium and other minerals fill in
- Cycle: approx. four months



Osteoblasts synthesize proteinaceous matrix, composed mostly of type I collagen, to fill in resorption pits. The proteinaceous matrix is gradually mineralized to form new bone.



CJASN

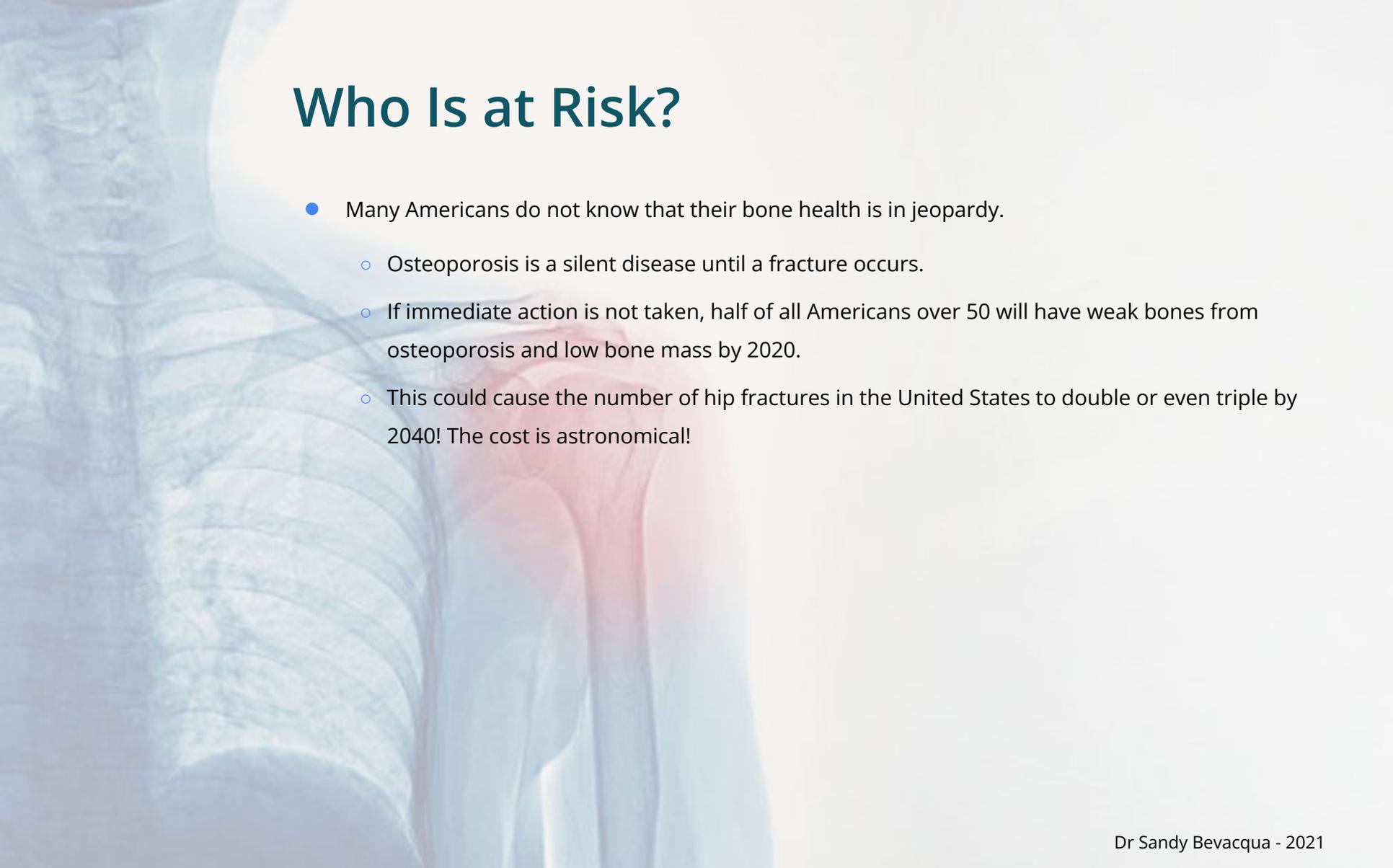
Clarke B CJASN 2008;3:S131-S139 ©2008 by American Society of Nephrology

Vertebral Compression Fractures (VCF's)

- Multiple VCFs can cause kyphosis, also known as a “dowager’s hump.” The **stooped posture and chronic pain** associated with VCFs contribute to an overall poor quality of life.

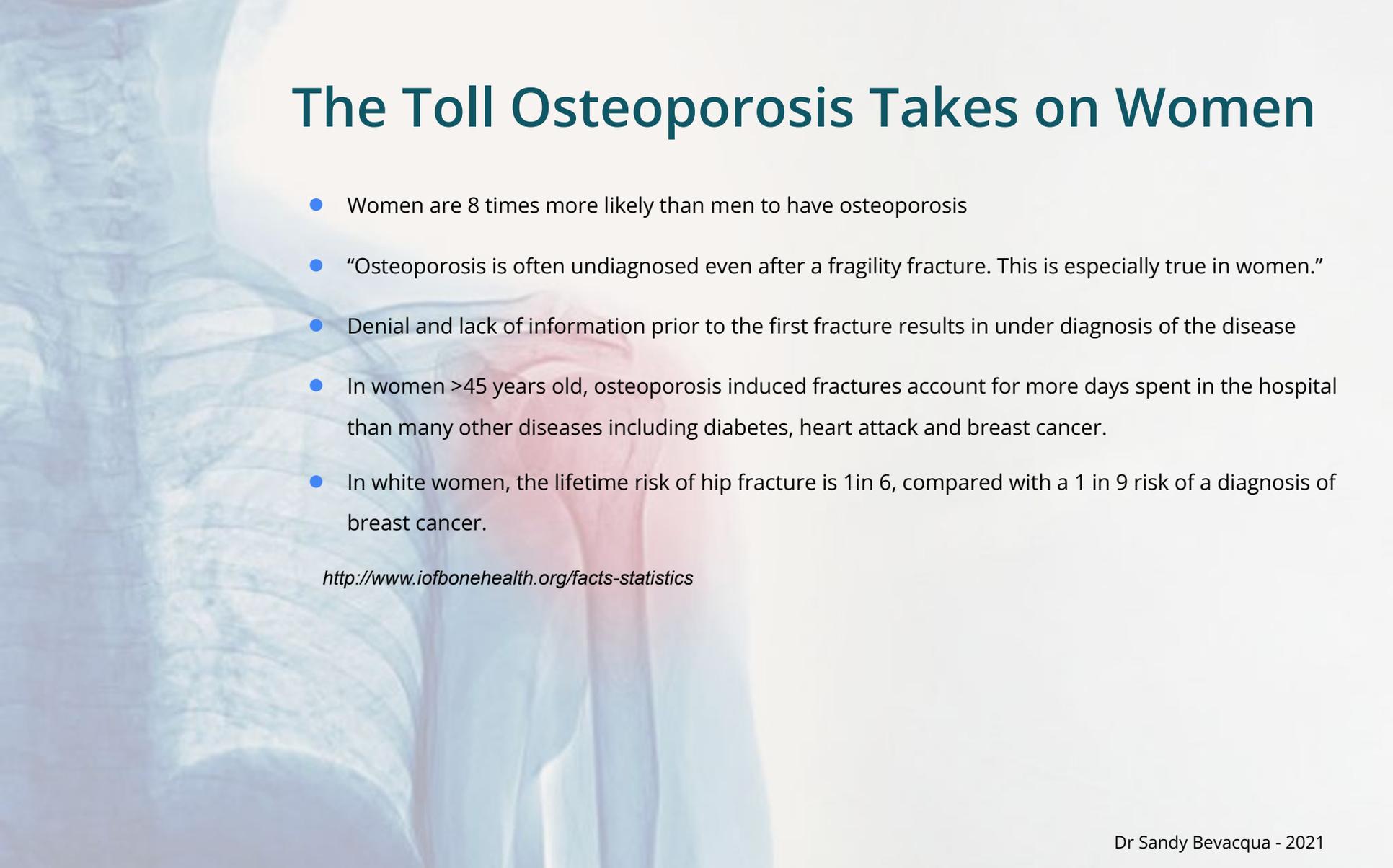
It’s important to know whether or not you have osteoporosis, because disease progression can usually be stopped and reversed.





Who Is at Risk?

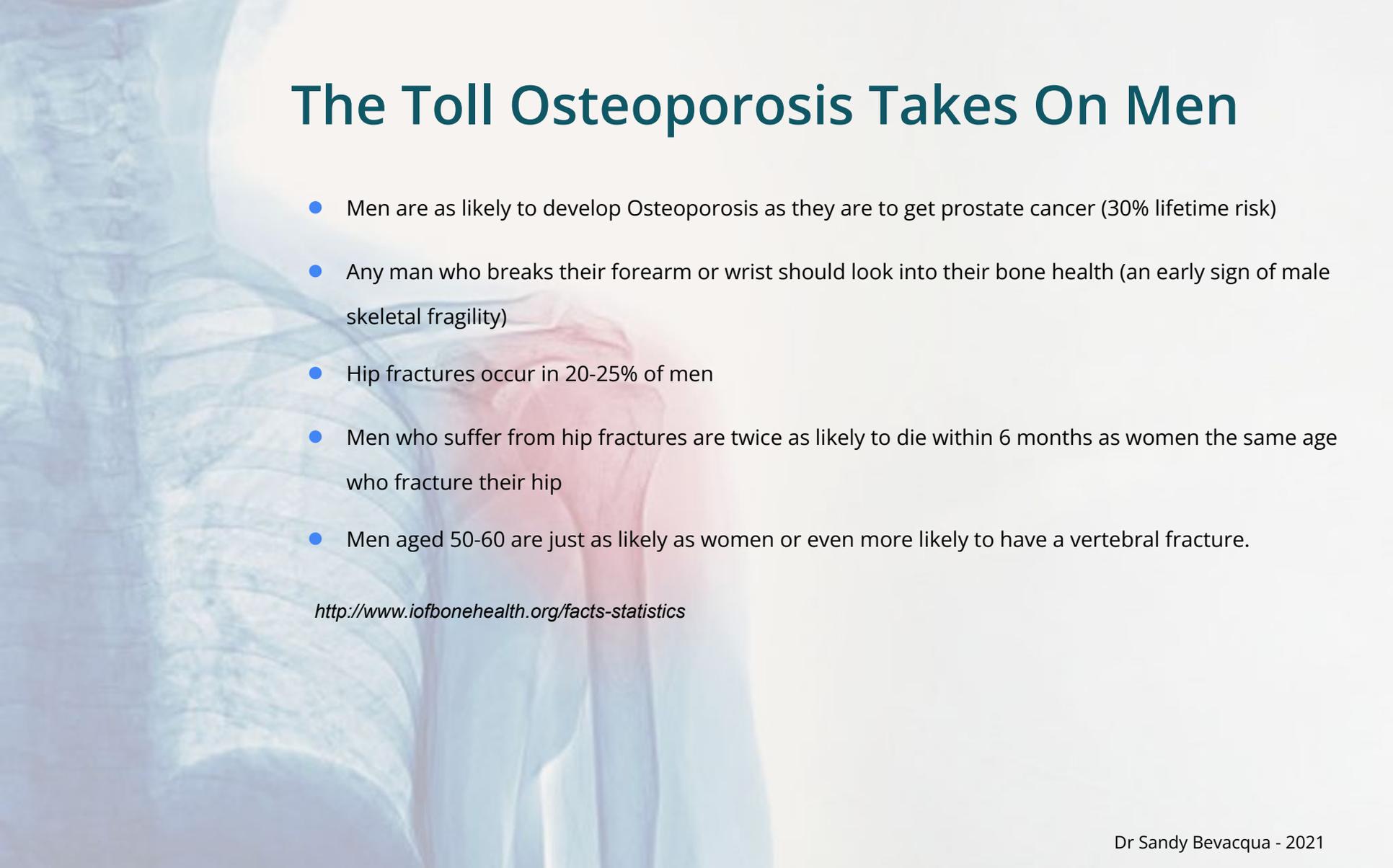
- Many Americans do not know that their bone health is in jeopardy.
 - Osteoporosis is a silent disease until a fracture occurs.
 - If immediate action is not taken, half of all Americans over 50 will have weak bones from osteoporosis and low bone mass by 2020.
 - This could cause the number of hip fractures in the United States to double or even triple by 2040! The cost is astronomical!



The Toll Osteoporosis Takes on Women

- Women are 8 times more likely than men to have osteoporosis
- “Osteoporosis is often undiagnosed even after a fragility fracture. This is especially true in women.”
- Denial and lack of information prior to the first fracture results in under diagnosis of the disease
- In women >45 years old, osteoporosis induced fractures account for more days spent in the hospital than many other diseases including diabetes, heart attack and breast cancer.
- In white women, the lifetime risk of hip fracture is 1 in 6, compared with a 1 in 9 risk of a diagnosis of breast cancer.

<http://www.iofbonehealth.org/facts-statistics>



The Toll Osteoporosis Takes On Men

- Men are as likely to develop Osteoporosis as they are to get prostate cancer (30% lifetime risk)
- Any man who breaks their forearm or wrist should look into their bone health (an early sign of male skeletal fragility)
- Hip fractures occur in 20-25% of men
- Men who suffer from hip fractures are twice as likely to die within 6 months as women the same age who fracture their hip
- Men aged 50-60 are just as likely as women or even more likely to have a vertebral fracture.

<http://www.iofbonehealth.org/facts-statistics>



Worldwide Impact of Osteoporosis

- Worldwide, osteoporosis causes more than 8.9 million fractures annually, resulting in an osteoporotic fracture every 3 seconds
- In Europe disability caused by Osteoporosis is greater than that caused by cancer
- 12 million Americans over the age of 50 are estimated to have been diagnosed osteoporosis with another 36 million at risk
- Nearly 75% of hip, spine and distal forearm fractures occur among patients 65 years old or over

<http://www.iofbonehealth.org/facts-statistics>

The Toll Hip Fractures Take

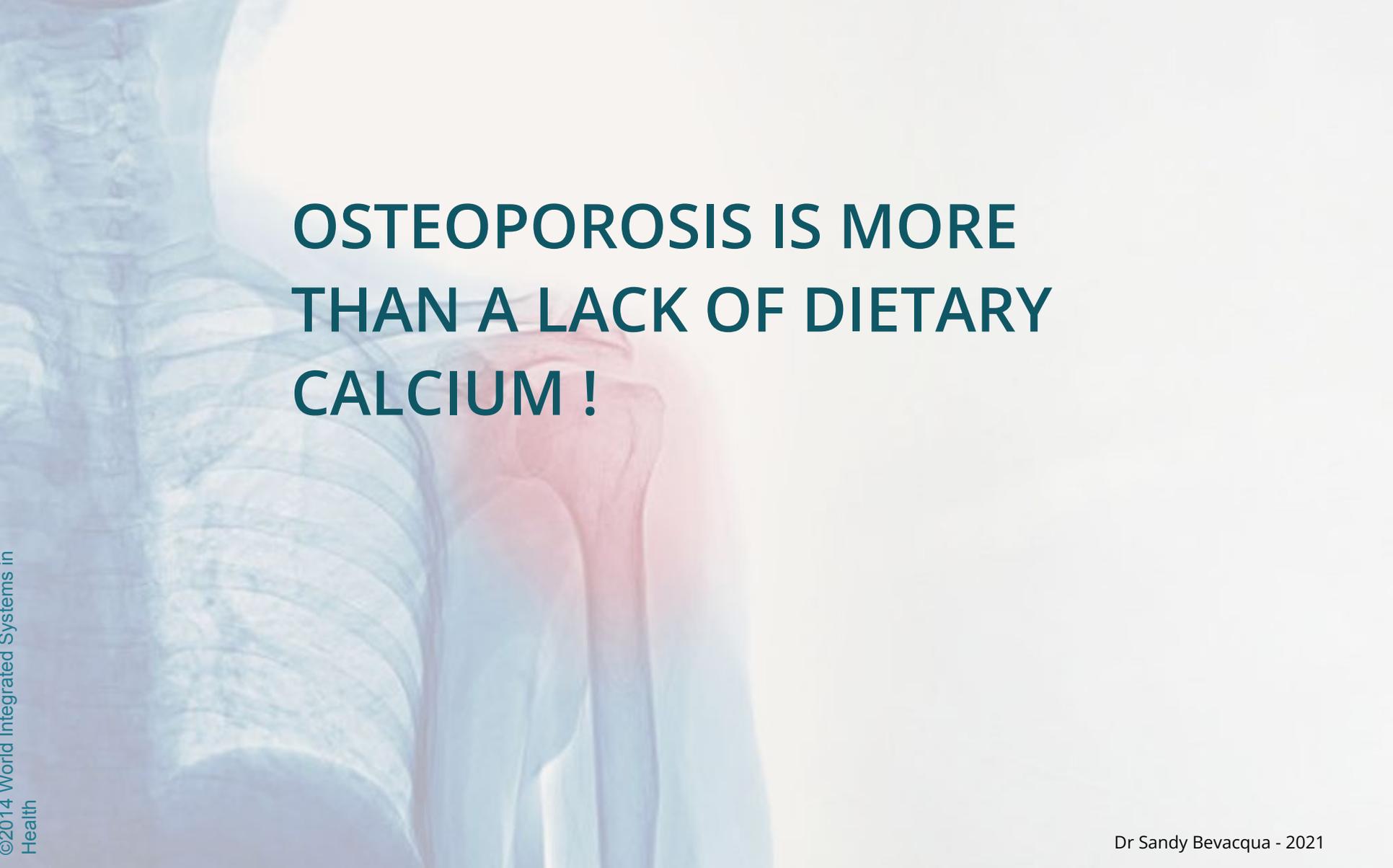
- Hip fractures cause the most morbidity with reported mortality rates up to 20-24% in the first year
- 95% of hip fractures are the result of a fall
- 1 in 3 adults over the age of 65 will experience a significant fall/year
- 20-30% of falls result in long term functional impairment and the ability to live on their own
- Men account for 1 out of 4 hip fractures, but are twice as likely to die as women
- Hip fractures cause a loss of function and independence:
 - 40% are unable to walk independently
 - 60% required assistance a year later
 - 33% were totally dependent or had to move into a nursing home within a year of the fracture
 - Less than 50% regain their previous level of function

The Cost of Hip Fractures

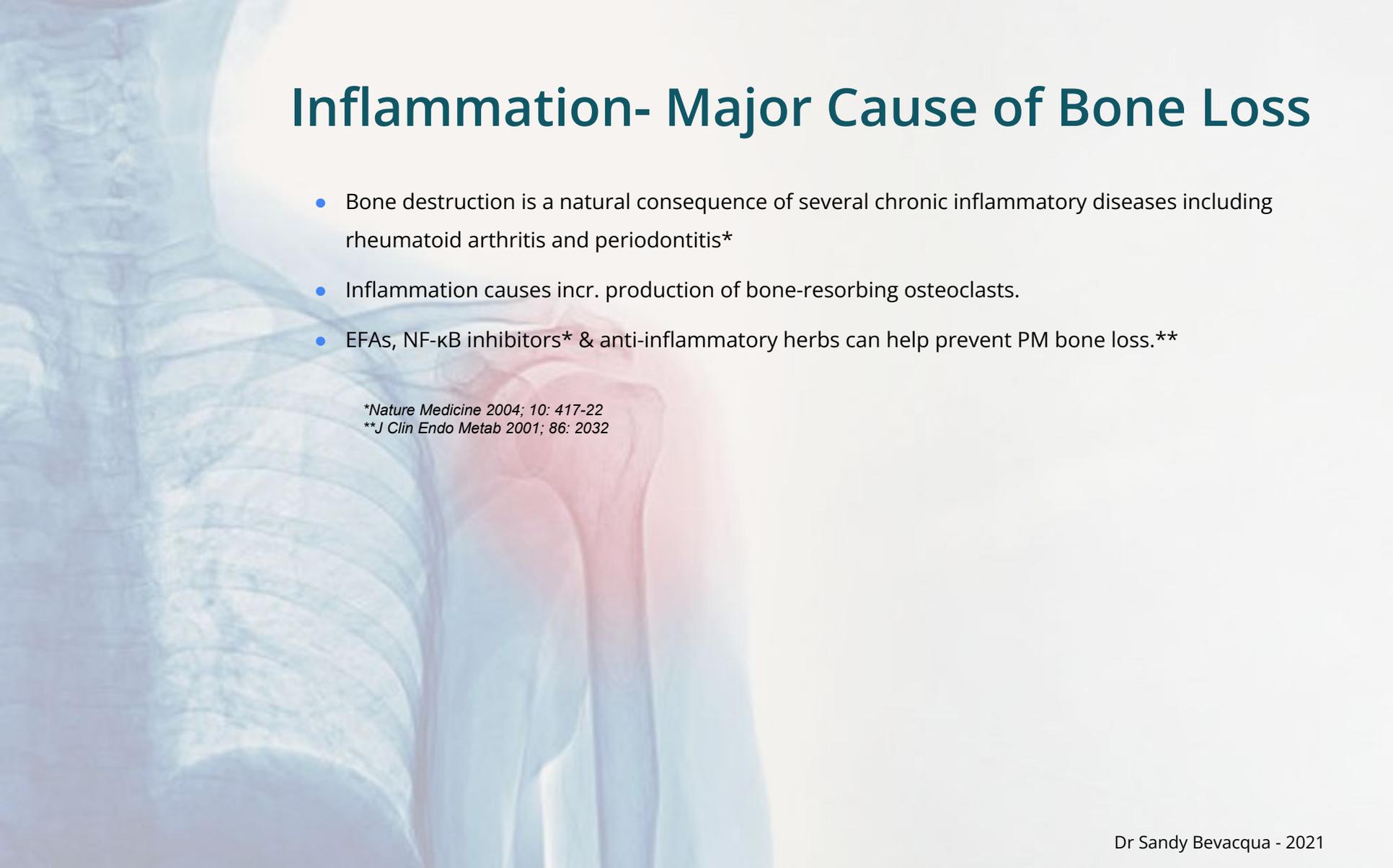
- Hip fractures- the most devastating type of bone fracture, account for ~300,000 hospitalizations/yr.
- Of hip fracture patients:
 - 20 percent die within a year of fracture
 - Another 20 percent end up in a nursing home within a year
 - Many become isolated, depressed, or afraid to leave home because they fear falling again
 - Loss of quality of life
 -
- Costly for society and individuals with the disease.
 - Care for bone fractures from osteoporosis costs the U.S. nearly \$18 billion each year.
 - The cost of a hip fracture for one individual can exceed \$81,000 during their lifetime.

What are the Issues?

- Poor diet- Processed and Junk food
- Insufficient vegetable intake
- Vegan/ Low Protein diets
- Diet rich in meat & sat. fat (incr. Ca⁺ excr.)
- Sedentary living & Poor exercise habits
- Poor posture
- Smoking
- Alcohol, Coffee and/or Soda consumption
- Improper use of supplementation
- Proton pump Inhibitors, sedatives, tranquilizers, and antidepressant drugs



**OSTEOPOROSIS IS MORE
THAN A LACK OF DIETARY
CALCIUM !**

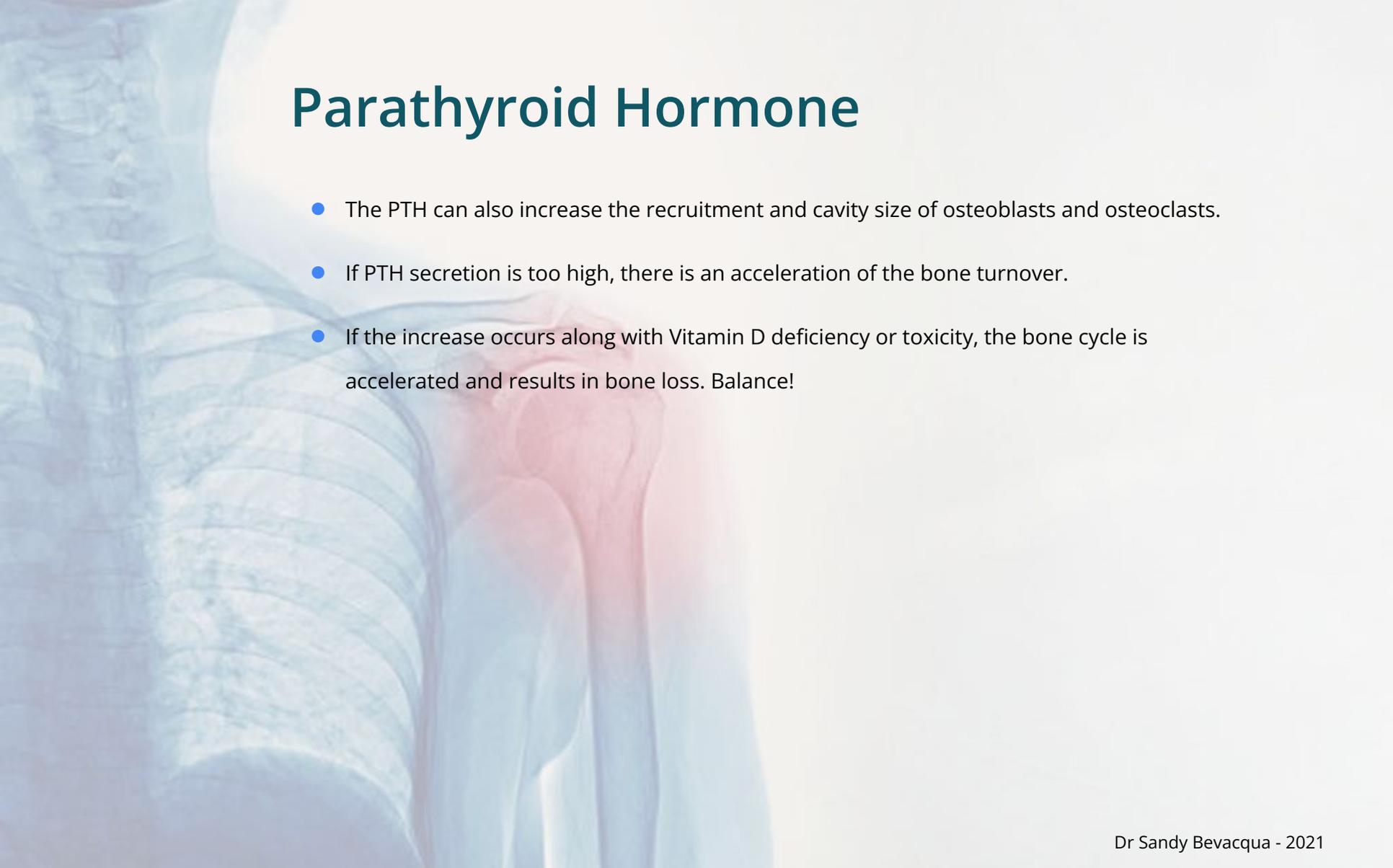


Inflammation- Major Cause of Bone Loss

- Bone destruction is a natural consequence of several chronic inflammatory diseases including rheumatoid arthritis and periodontitis*
- Inflammation causes incr. production of bone-resorbing osteoclasts.
- EFAs, NF- κ B inhibitors* & anti-inflammatory herbs can help prevent PM bone loss.**

**Nature Medicine 2004; 10: 417-22*

***J Clin Endo Metab 2001; 86: 2032*



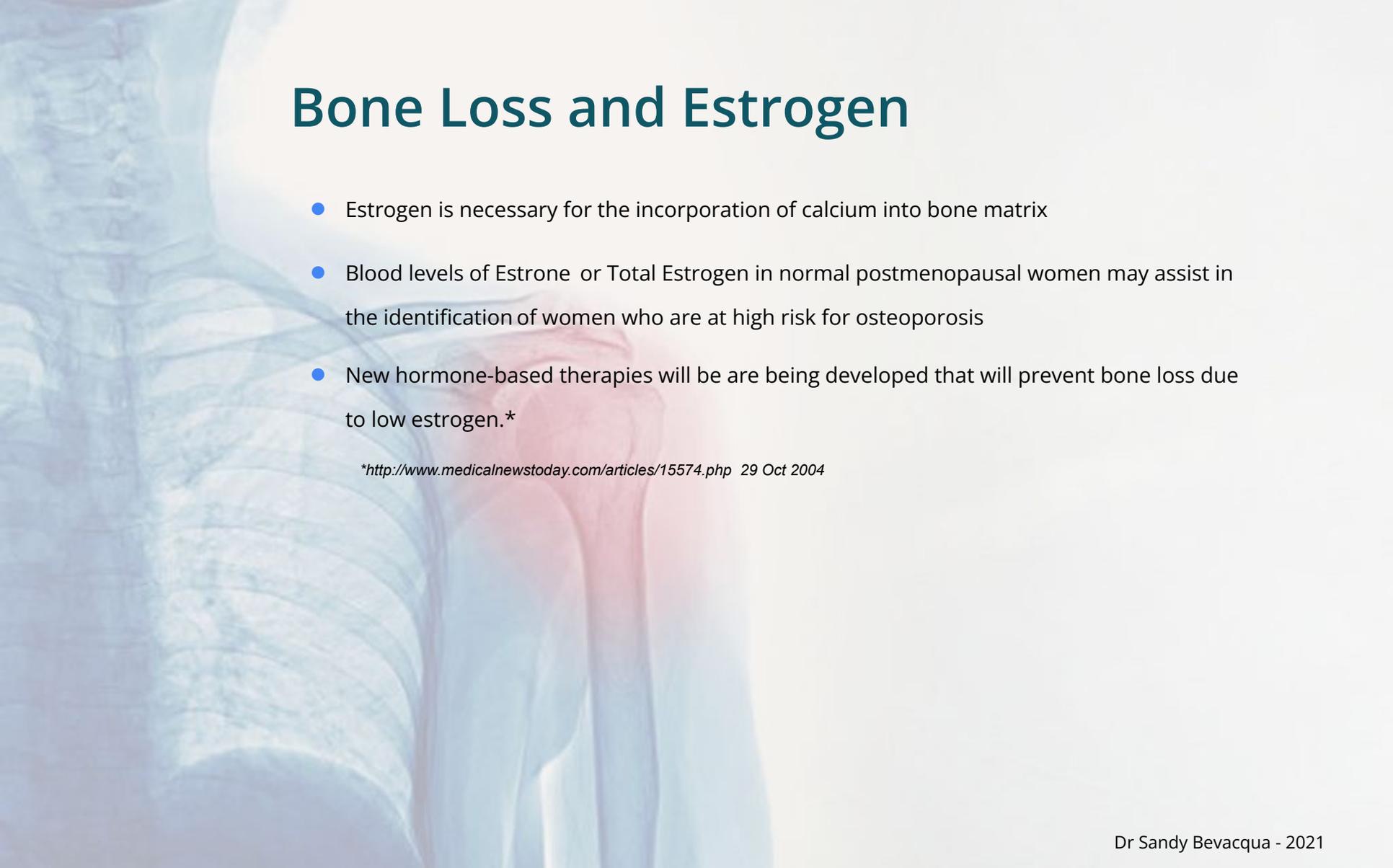
Parathyroid Hormone

- The PTH can also increase the recruitment and cavity size of osteoblasts and osteoclasts.
- If PTH secretion is too high, there is an acceleration of the bone turnover.
- If the increase occurs along with Vitamin D deficiency or toxicity, the bone cycle is accelerated and results in bone loss. Balance!



Osteoporosis is a Complex Condition

- Osteoblasts have estrogen receptors;
- Estrogen increases collagen production by increasing the number of osteoblasts.
- The osteoclasts also have estrogen receptors; Estrogens inhibit their recruitment.



Bone Loss and Estrogen

- Estrogen is necessary for the incorporation of calcium into bone matrix
- Blood levels of Estrone or Total Estrogen in normal postmenopausal women may assist in the identification of women who are at high risk for osteoporosis
- New hormone-based therapies will be are being developed that will prevent bone loss due to low estrogen.*

**<http://www.medicalnewstoday.com/articles/15574.php> 29 Oct 2004*

Protein Deficiency

- Bone is made of a collagen matrix imbedded with minerals.
- Collagen has 17aa's
- Low fat diet is a low protein diet
- Recent 6mo study
 - Spinal bone of 66 post menopausal women
 - Soy protein alone incr. bone density by 2%
- Soy protein has the quality of steak and egg without the fat or cholesterol
- Total protein intake .5 – 1g per lb of body weight

Vitamin D

- “Vit D deficiency is now recognized as a pandemic.” *
- Essential for calcium metabolism.
- Usually made by sunshine on skin.
- SPF 8 blocks 90% of vit D production.
- Boston Hospital
 - 59% of all patients had vit D deficiency
 - 30% of all patients with hip fractures- extremely low levels of vit D
- Increase incidence of soft skull bones in normal-looking babies reflects vitamin D def. during pregnancy.**
- ~2000 IU per day for a normal bone density
- 4,000-10,000 IU per day for Osteoporosis/Osteopenia
- **We need to be more aware of vit D than Calcium!**

• *[*http://ajcn.nutrition.org/content/87/4/1080S.full](http://ajcn.nutrition.org/content/87/4/1080S.full)*

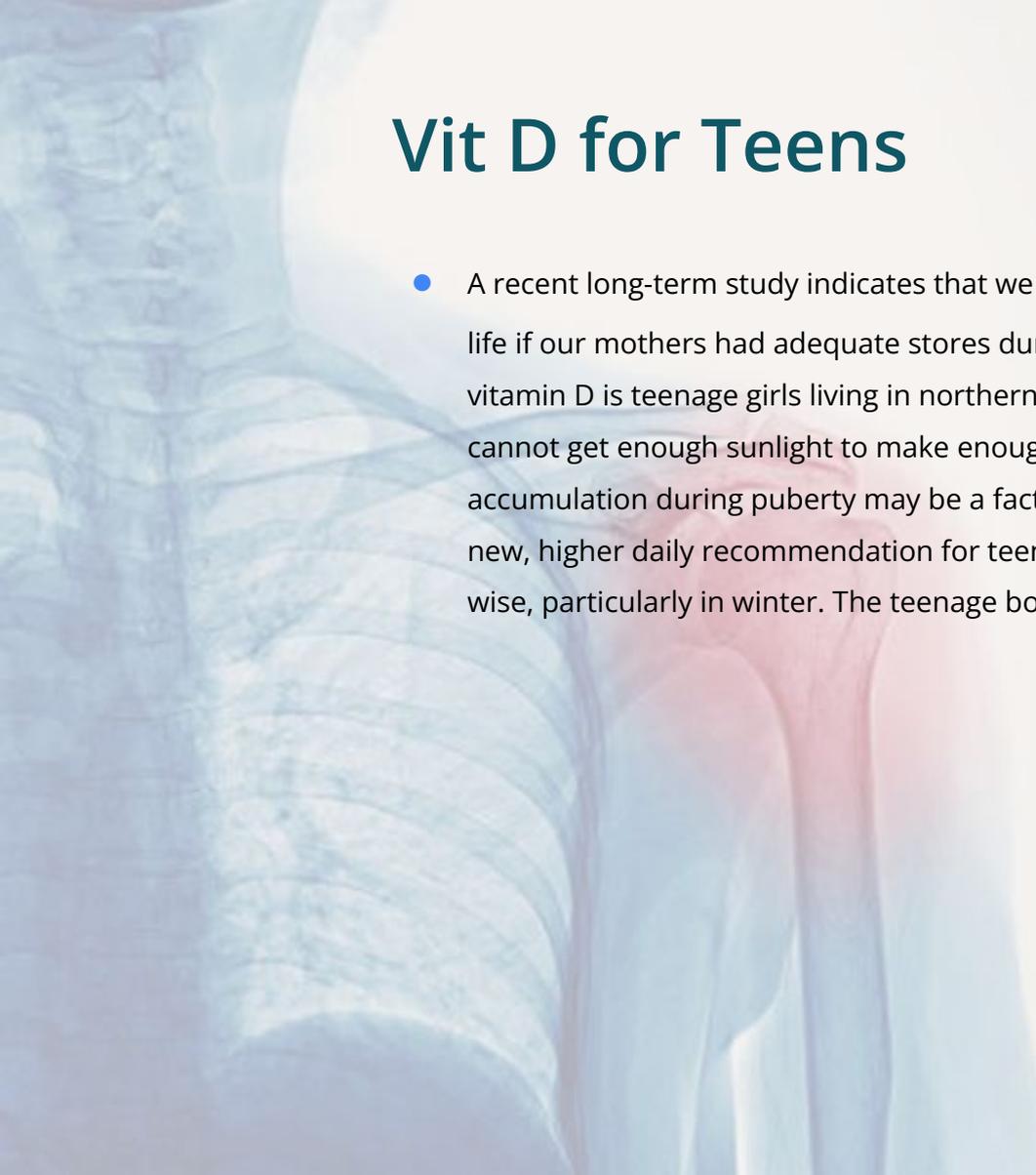
• *[**http://www.sciencedaily.com/releases/2008/03/080326202311.htm](http://www.sciencedaily.com/releases/2008/03/080326202311.htm)*

Symptoms of Vitamin D Deficiency

- Osteoarthritis
- Autoimmune illness
- Cancer
- Chronic pain
- Diabetes
- Heart disease
- Hyperparathyroidism
- Hypertension
- Depression
- Mental illness
- Multiple sclerosis
- Muscle weakness and coordination
- Obesity

How can you tell?

- Your bones ache.
- You're depressed
- You're 50 or older
- Your overweight
- You have darker skin
- You're a big time head-sweater
- You have intestinal troubles
- You have high levels of environmental toxins



Vit D for Teens

- A recent long-term study indicates that we are at less risk of developing osteoporosis later in life if our mothers had adequate stores during pregnancy. Another age group needing ample vitamin D is teenage girls living in northern (or extra hot climates), who for much of the year cannot get enough sunlight to make enough vitamin D naturally. Optimal bone growth and accumulation during puberty may be a factor in preventing osteoporosis later on in life, and a new, higher daily recommendation for teenage girls (2000 IU — up from 200 IU) would be wise, particularly in winter. The teenage boys at risk could probably use some as well.

How To Get Enough Vitamin D

- There are 3 ways for adults to ensure adequate levels of vitamin D:
 - regularly receive midday sun exposure in the late spring, summer, and early fall, exposing as much of the skin as possible for 20–30 minutes (being careful to never burn). (Those with dark skin will need longer exposure time — up to six times longer!) Consider using a sun bed (avoiding sunburn) during the colder months.
 - Meanwhile, live where the environment is clean, avoid exposure to pollution like the plague and avoid any medications that block your body from making Vitamin D.
 - Also, consider supplementation: The Vitamin D Council recommends taking 4-5,000 IU per day for 2–3 months, then obtain a blood test for 25-hydroxy vit D.
 - Adjust your dosage so that blood levels are between 60–100 ng/mL year-round. Monitor your electrolytes and parathyroid function as is needed.

Vitamin D Safety — Make Sure You Get Your Vitamin A

- Animal studies show that vitamins D and A each protect against toxic effects of the other -- suggesting that vitamin toxicity might be more a result of vitamin imbalance than vitamin excess.
- Vitamin D increases the need for vitamin A in chickens even in small amounts that are insufficient to guarantee freedom from rickets. One study showed that massive doses of vitamin A alone caused bone and growth problems in turkeys, while massive doses of vitamin D alone caused kidney problems -- yet when these doses were combined, the turkeys exhibited no signs of toxicity at all.
- In humans, supplementation with vitamin D appears from case reports to allow the average 75-kg human to take an *additional* 175,000 IU of vitamin A per day before vitamin A toxicity symptoms begin to develop.

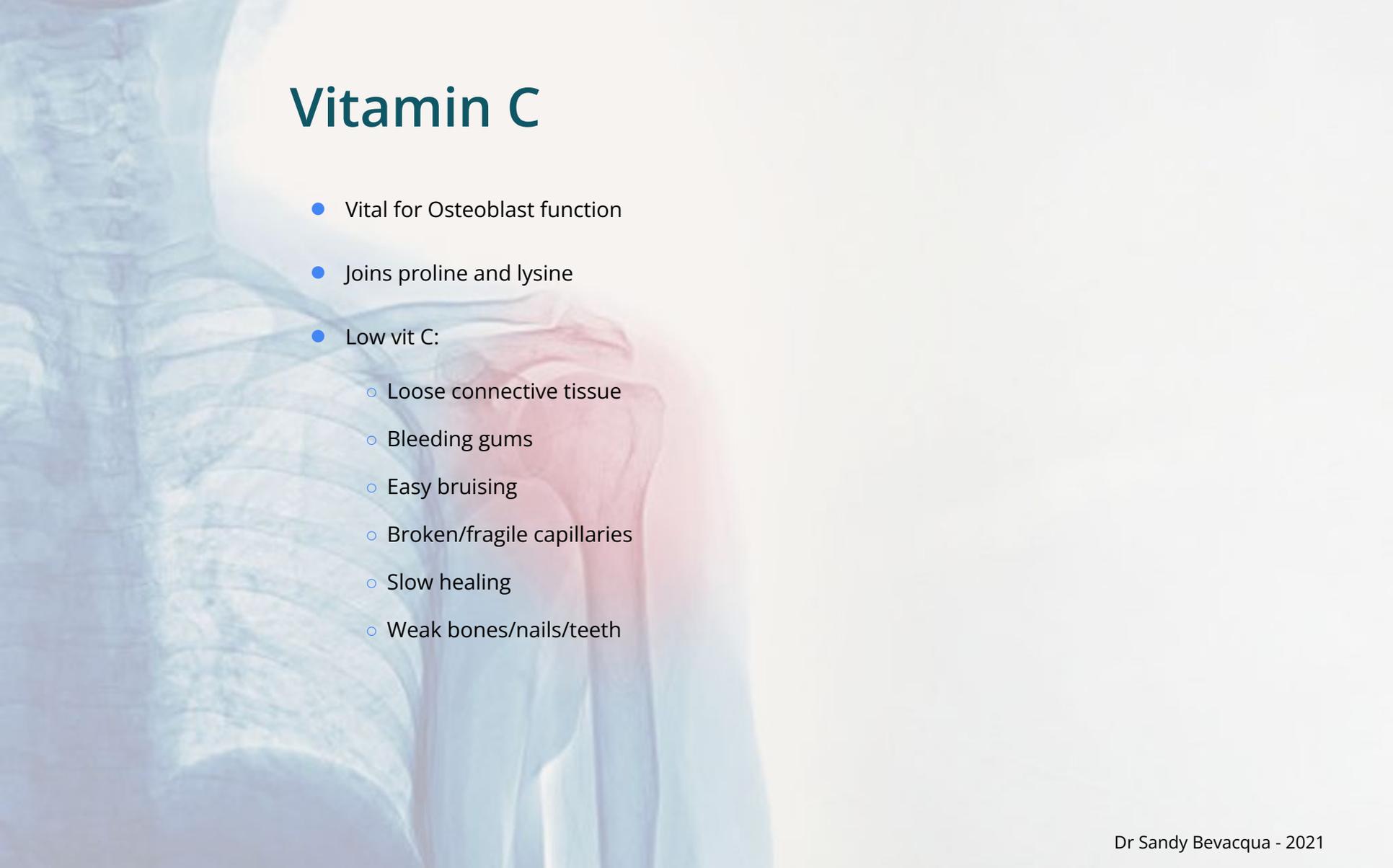
Vitamin K

- Several Vit K dependant proteins are involved in bone formation.
 - Osteocalcin: secreted by osteoblasts & used to anchor calcium to the bone matrix.
 - Others involved in calcium transport and the use of vit D.
- Vitamin K is essential for activating osteocalcin
- Tufts University: groups w/ resistant Osteo
 - Vit K for 5 days: useable Osteocalcin increased by 41%
- 81micrograms recommended; found in sesame, dark leafy green vegetables, dairy.

Sources of Vitamin K

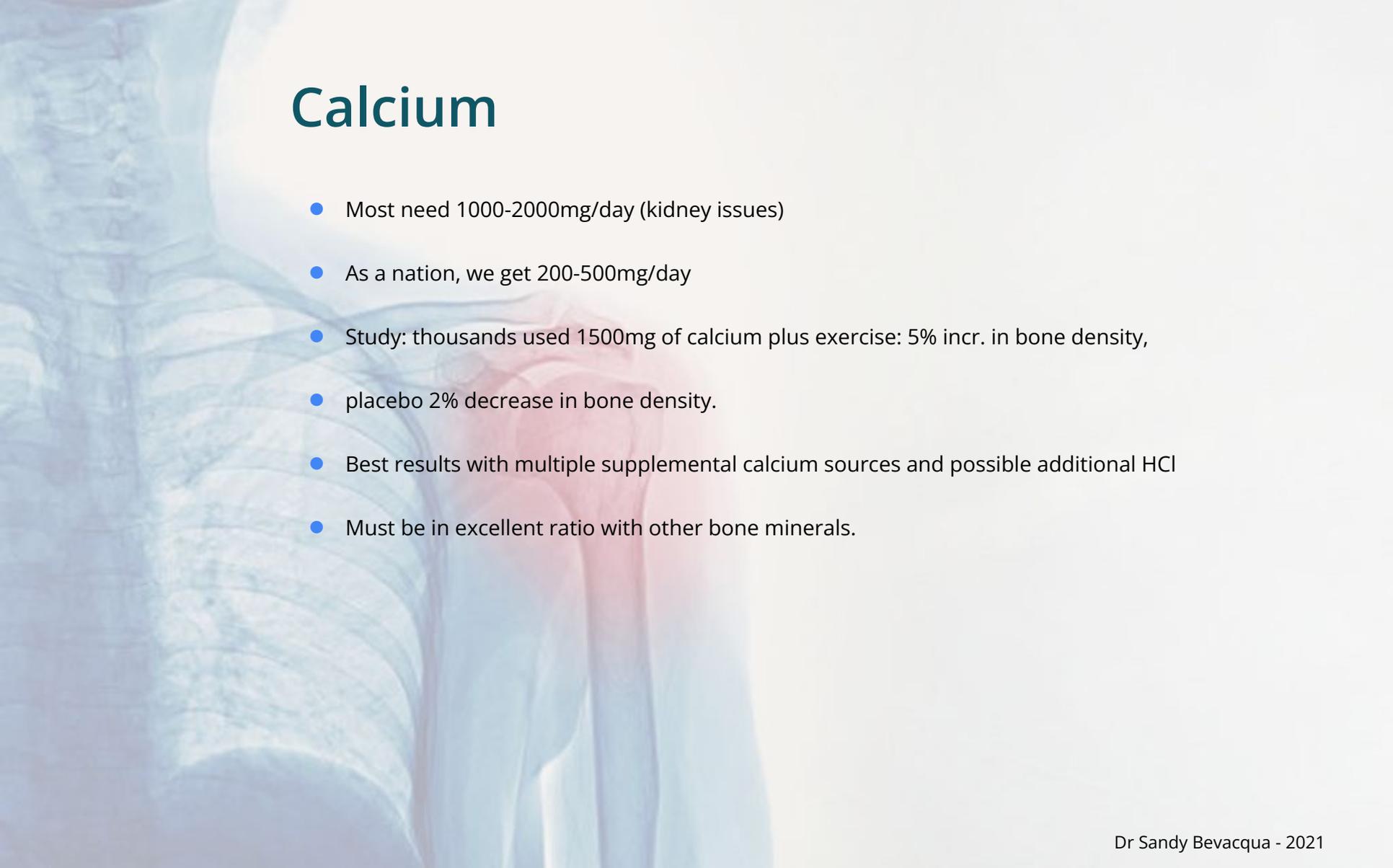
- Dark leafy green vegetables
 - Broccoli
 - Kale
 - Cabbage
 - Spinach
 - Green tea
 - Asparagus
 - Fresh green peas
- Dark leafy greens are an excellent source of calcium, boron & many other minerals.

Vitamin C



- Vital for Osteoblast function
- Joins proline and lysine
- Low vit C:
 - Loose connective tissue
 - Bleeding gums
 - Easy bruising
 - Broken/fragile capillaries
 - Slow healing
 - Weak bones/nails/teeth

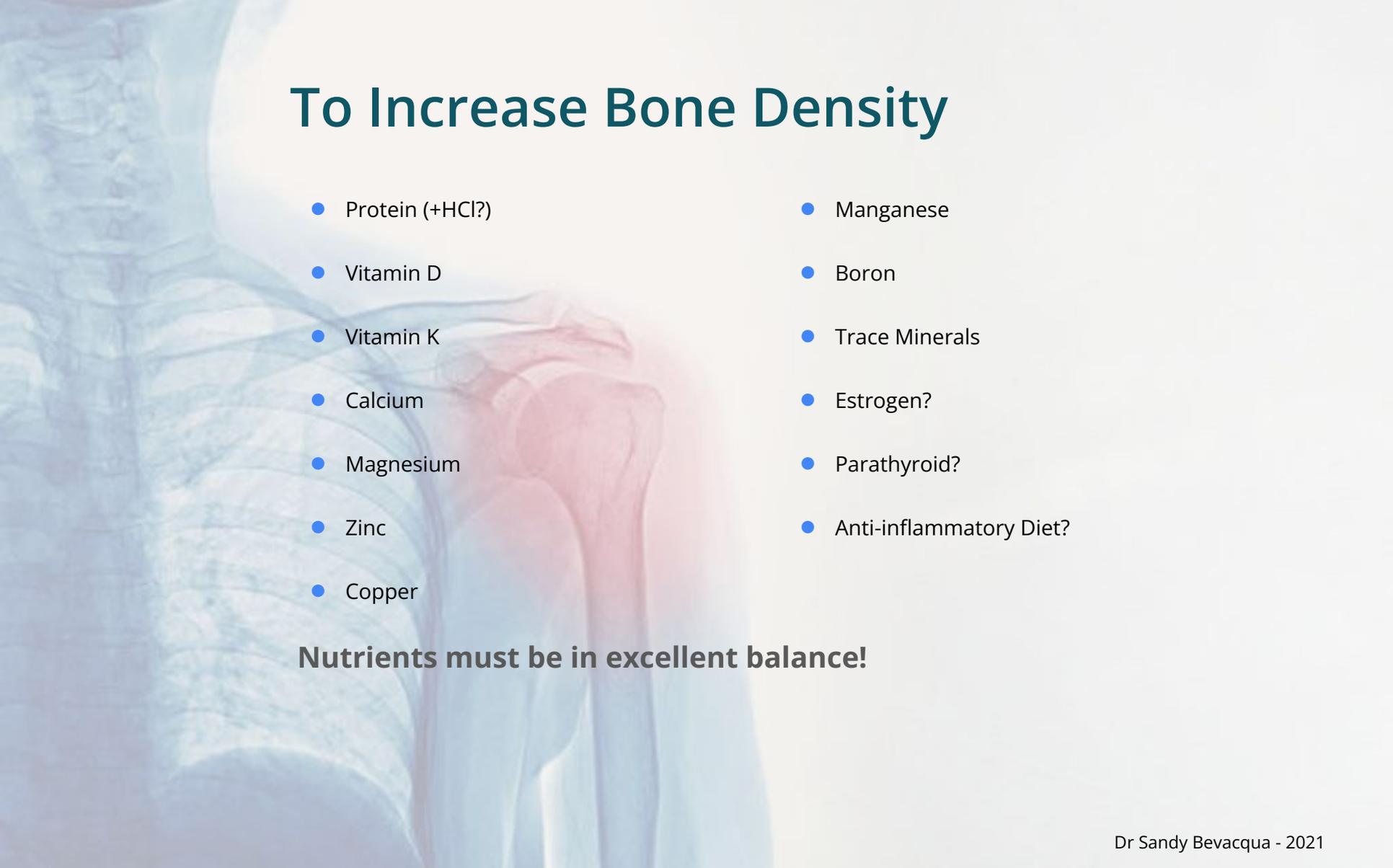
Calcium



- Most need 1000-2000mg/day (kidney issues)
- As a nation, we get 200-500mg/day
- Study: thousands used 1500mg of calcium plus exercise: 5% incr. in bone density,
- placebo 2% decrease in bone density.
- Best results with multiple supplemental calcium sources and possible additional HCl
- Must be in excellent ratio with other bone minerals.

Calcium Alone Does Not Help Bone Loss

- **Spinal bone loss in postmenopausal women supplemented with calcium and trace minerals**, Strause L¹, Saltman P, Smith KT, Bracker M, Andon MB, J Nutr. 1994 Jul;124(7):1060-4.
- **Abstract:**
- The effects of calcium supplementation (as calcium citrate malate, 1000 mg elemental Ca/d) with and without the addition of zinc (15.0 mg/d), manganese (5.0 mg/d) and copper (2.5 mg/d) on spinal bone loss (L2-L4 vertebrae) was evaluated in healthy older postmenopausal women (n = 59, mean age 66 y) in a 2-y, double-blind, placebo-controlled trial. Changes (mean +/- SEM) in bone density were -3.53 +/- 1.24% (placebo), -1.89 +/- 1.40% (trace minerals only), -1.25 +/- 1.46% (calcium only) and 1.48 +/- 1.40% (calcium plus trace minerals). Bone loss relative to base-line value was significant (P = 0.0061) in the placebo group but not in the groups receiving trace minerals alone, calcium alone, or calcium plus trace minerals. The only significant group difference occurred between the placebo group and the group receiving calcium plus trace minerals (P = 0.0099). These data suggest that bone loss in calcium-supplemented, older postmenopausal women can be further arrested by concomitant increases in trace mineral intake.



To Increase Bone Density

- Protein (+HCl?)
- Vitamin D
- Vitamin K
- Calcium
- Magnesium
- Zinc
- Copper
- Manganese
- Boron
- Trace Minerals
- Estrogen?
- Parathyroid?
- Anti-inflammatory Diet?

Nutrients must be in excellent balance!

Exercise

- Study: 1500 women, 50-73yrs
 - One hour, 2x/week
 - Dancing, floor exercise, stair climbing, treadmill, weight lifting
 - 3.5% incr. in bone density!!!!
- Weight bearing exercising is not essential but is extremely helpful in successfully increasing bone density.
- Mayo Clinic website exercises:

<http://www.mayoclinic.com/health/osteoporosis/WO00048&slide=1>



Problem with Bisphosphonates

- A connection was discovered between bisphosphonates and a serious bone condition called Osteonecrosis of the jaw (ONJ). This finding, published in the Journal of Oral and Maxillofacial Surgeons, showed the side effects of Fosamax may include ONJ.
- Other bisphosphonates include Actonel, Boniva, Bonefos, Didronel, Aredia, Skelid and Zometa.

http://www.lawyersandsettlements.com/case/fosamax?ref=fosamax_adwords



Fosamax Side Effects

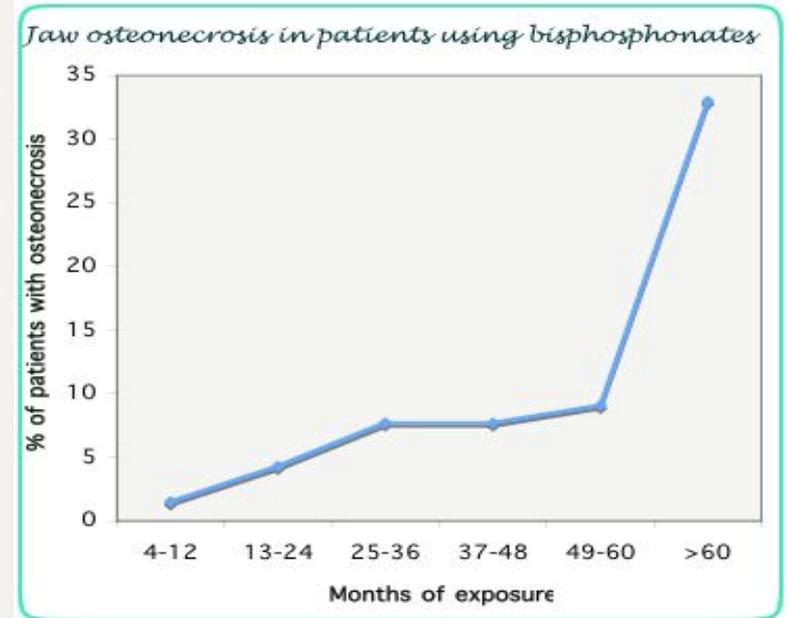
- In **Osteonecrosis (ONJ)** the jaw bone decays and dies, often resulting in jaw infection and exposed portions of bone inside of the mouth.
- This condition also known as: **Jaw Necrosis, Dead Jaw or Bis-Phossy Jaw.**
- It is caused by a lack of blood
 - flow to the jaw bone, and has
 - been directly linked to extended use of osteoporosis meds,
- especially Fosamax.

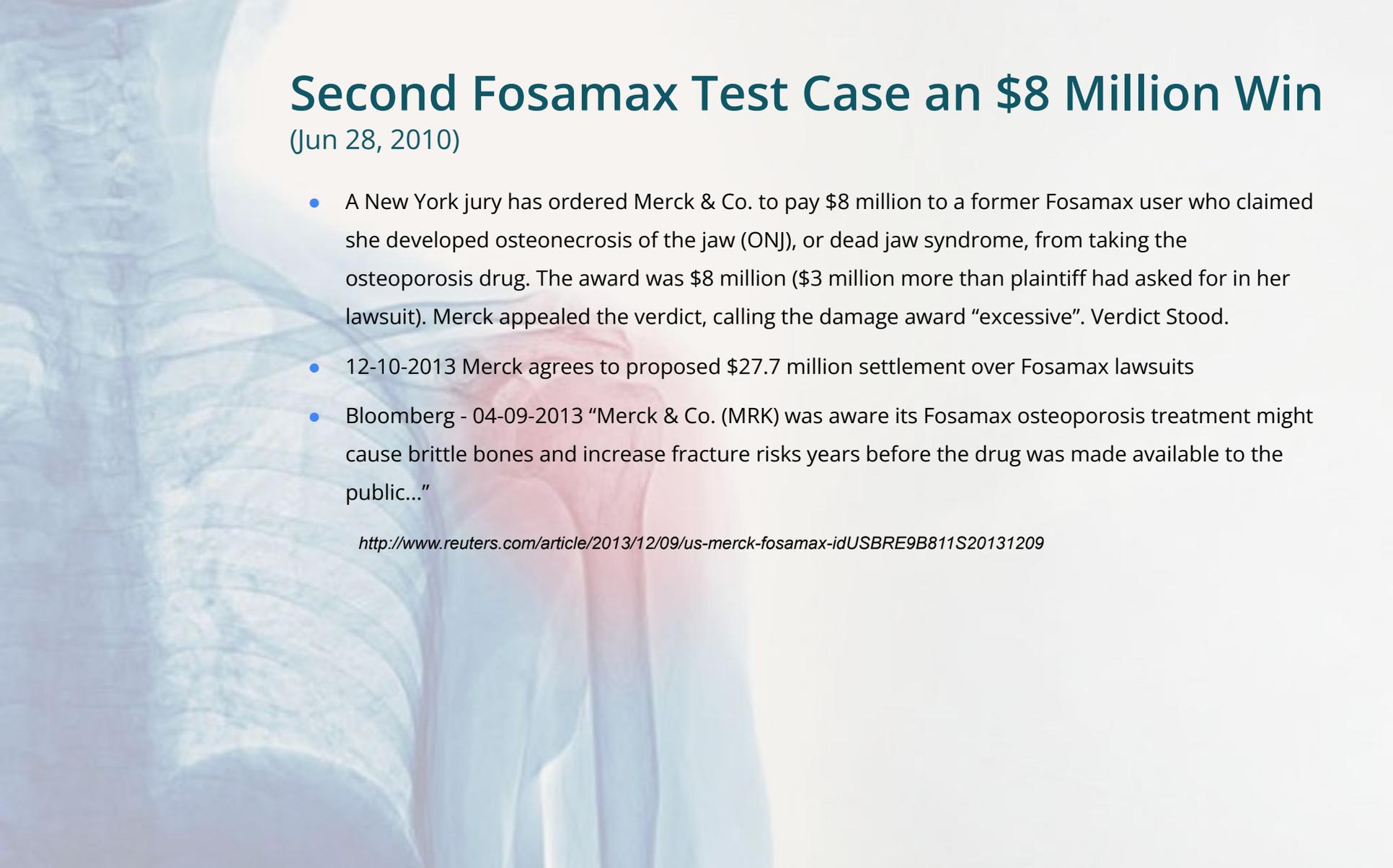


Fosamax is taken by nearly 10 million men and women!

Bisphosphonates and Osteonecrosis

- Osteonecrosis of the jaw causes severe infections, swelling, jaw bone exposure and loosening of teeth.
- Osteonecrosis patients often require long term antibiotic therapy or surgery to remove the dying bone tissue.
- Many people are filing Fosamax lawsuits in order to claim compensation for their expenses, pain and suffering.



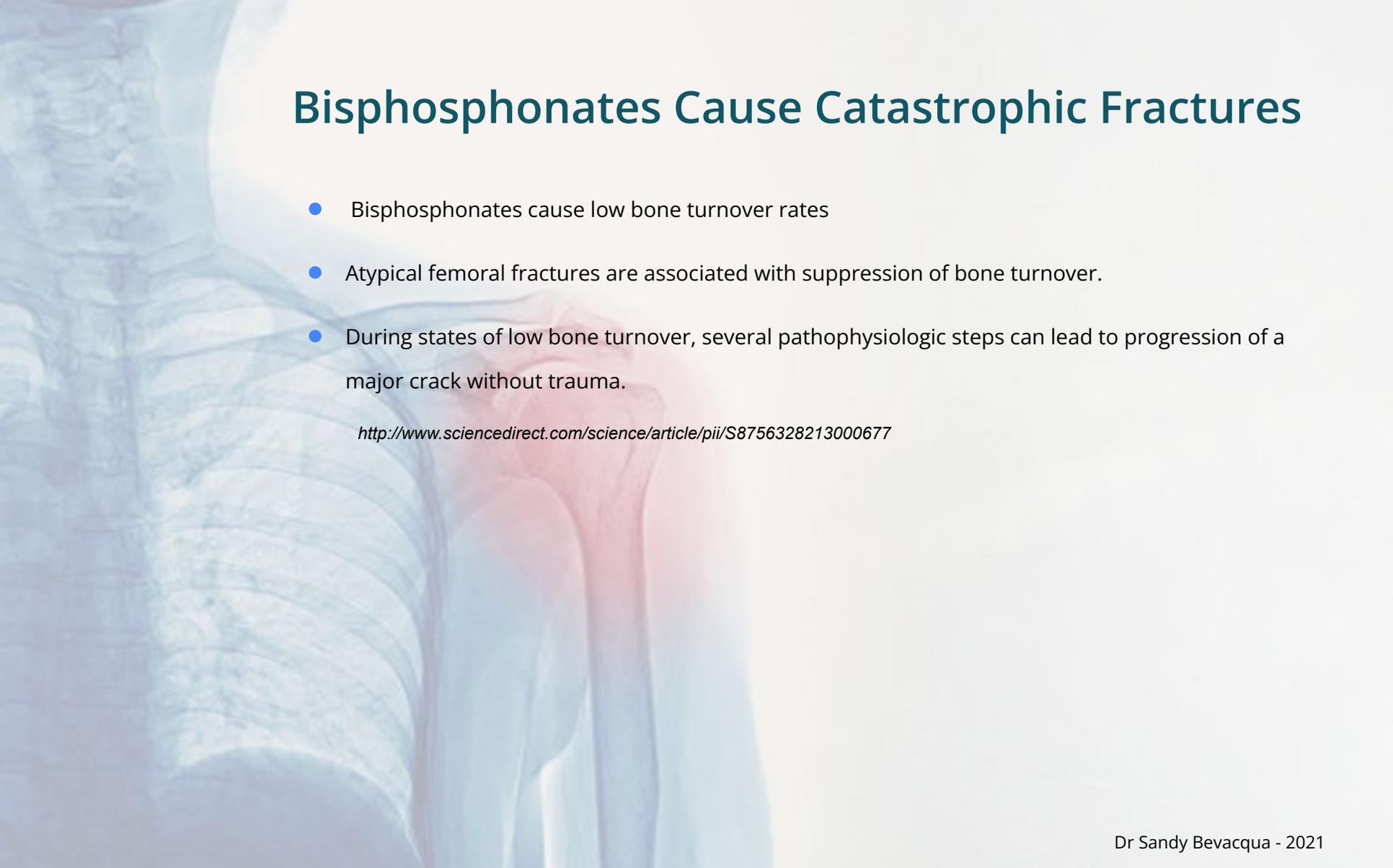


Second Fosamax Test Case an \$8 Million Win

(Jun 28, 2010)

- A New York jury has ordered Merck & Co. to pay \$8 million to a former Fosamax user who claimed she developed osteonecrosis of the jaw (ONJ), or dead jaw syndrome, from taking the osteoporosis drug. The award was \$8 million (\$3 million more than plaintiff had asked for in her lawsuit). Merck appealed the verdict, calling the damage award “excessive”. Verdict Stood.
- 12-10-2013 Merck agrees to proposed \$27.7 million settlement over Fosamax lawsuits
- Bloomberg - 04-09-2013 “Merck & Co. (MRK) was aware its Fosamax osteoporosis treatment might cause brittle bones and increase fracture risks years before the drug was made available to the public...”

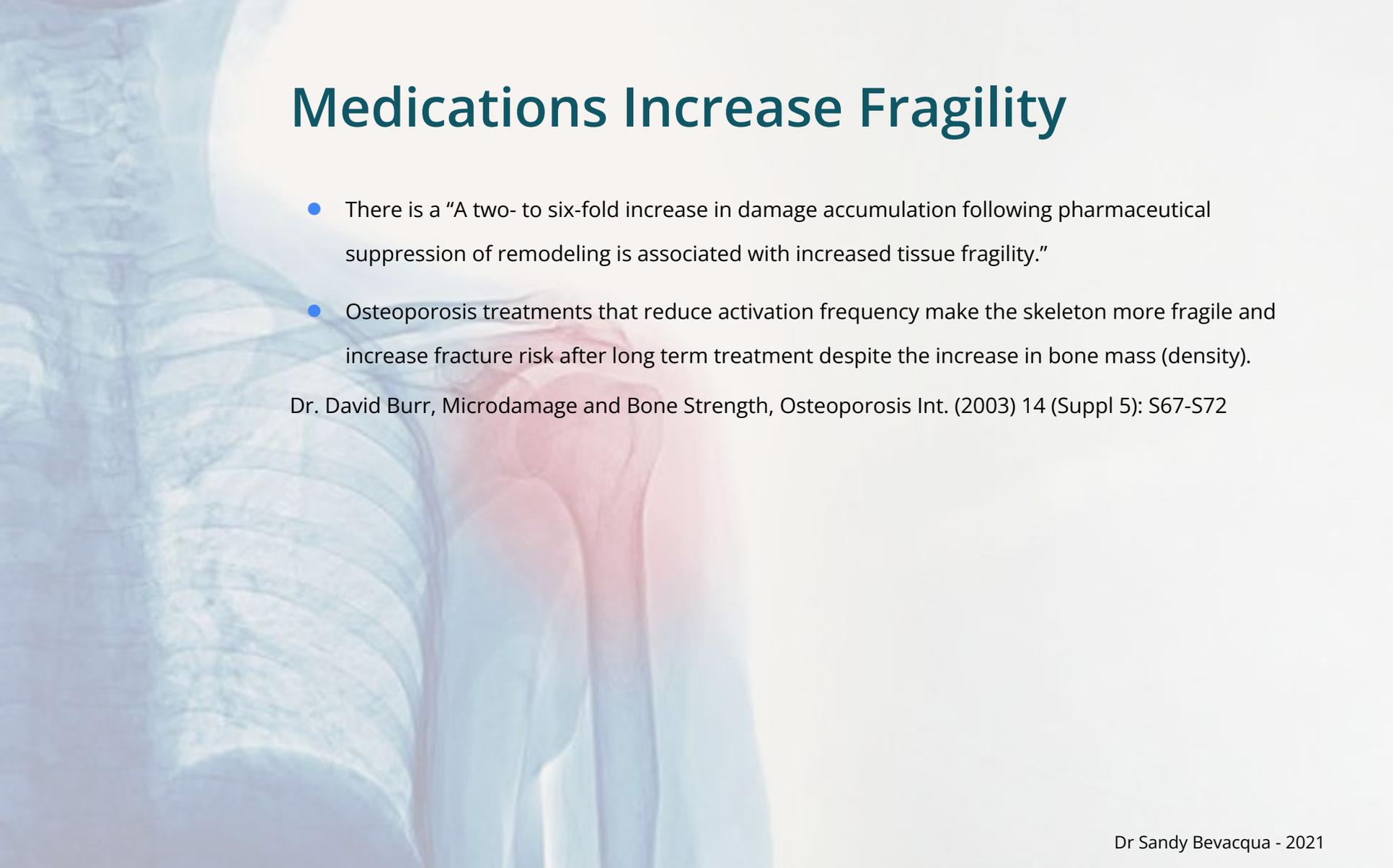
<http://www.reuters.com/article/2013/12/09/us-merck-fosamax-idUSBRE9B811S20131209>



Bisphosphonates Cause Catastrophic Fractures

- Bisphosphonates cause low bone turnover rates
- Atypical femoral fractures are associated with suppression of bone turnover.
- During states of low bone turnover, several pathophysiologic steps can lead to progression of a major crack without trauma.

<http://www.sciencedirect.com/science/article/pii/S8756328213000677>



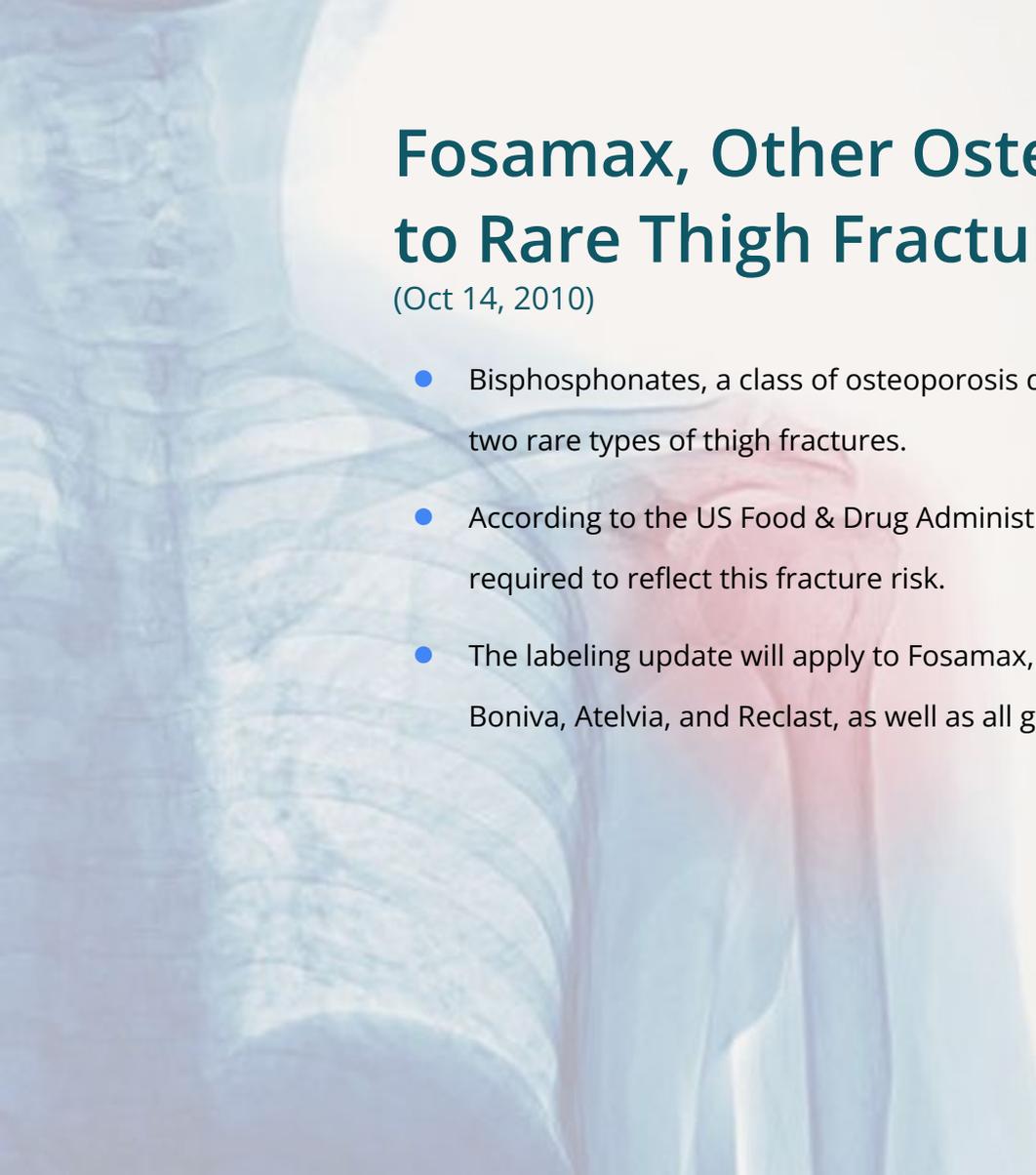
Medications Increase Fragility

- There is a “A two- to six-fold increase in damage accumulation following pharmaceutical suppression of remodeling is associated with increased tissue fragility.”
- Osteoporosis treatments that reduce activation frequency make the skeleton more fragile and increase fracture risk after long term treatment despite the increase in bone mass (density).

Dr. David Burr, Microdamage and Bone Strength, Osteoporosis Int. (2003) 14 (Suppl 5): S67-S72

Bisphosphonate-Induced Fractures

- Atypical dental implant failure with long-term bisphosphonate treatment—akin to atypical fractures?
 - Gayathri Subramanian, DMD, PhD, J. Christopher Fritton, PhD, Shankar Iyer, DDS, MDS, Samuel Y.P. Quek, DMD, MPH, *Bone*, Volume 55, Issue 1, July 2013, Pages 113–118
- Bisphosphonate Fractures as a Cause of Painful Total Hip Arthroplasty
 - Brian M. Curtin, MD; Thomas K. Fehring, MD, *Orthopedics*, December 2011 - Volume 34 · Issue 12: e939-e944
- Atypical Femur Fractures,
 - Wakenda Tyler, MD, MPH, Susan Bukata, MD, Regis O'Keefe, MD, PhD, *Clinics in Geriatric Medicine*, Volume 30, Issue 2, May 2014, Pages 349–359



Fosamax, Other Osteoporosis Drugs, Linked to Rare Thigh Fractures, FDA Warns

(Oct 14, 2010)

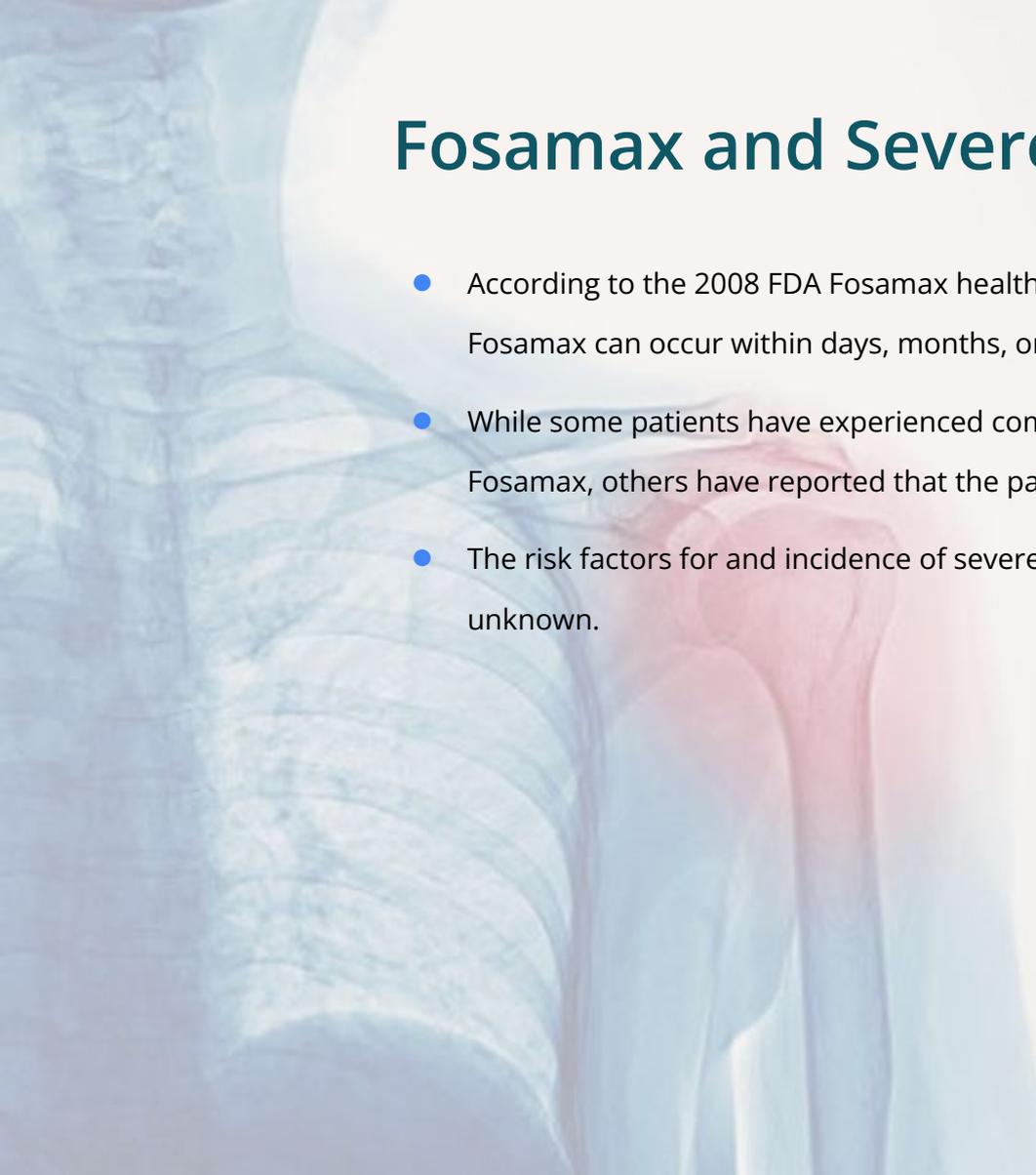
- Bisphosphonates, a class of osteoporosis drugs that includes Fosamax, have been linked to two rare types of thigh fractures.
- According to the US Food & Drug Administration (FDA), bisphosphonate labels are now required to reflect this fracture risk.
- The labeling update will apply to Fosamax, Fosamax Plus D, Actonel, Actonel with Calcium, Boniva, Atelvia, and Reclast, as well as all generic versions.



Long-term use of bone drugs may double esophageal cancer risk by Natalie James

- 9/3/10

- After examining their health records, the team found that **the risk of esophageal cancer was 30 percent higher** in people who had received one or more bisphosphonate prescriptions before diagnosis, compared with people who had never taken the drugs.
- Those who had received prescriptions for these drugs for at least three years, five years on average, the risk of esophageal cancer was more than doubled.



Fosamax and Severe Musculoskeletal Pain

- According to the 2008 FDA Fosamax health alert, severe musculoskeletal pain associated with Fosamax can occur within days, months, or years after starting treatment with the drug.
- While some patients have experienced complete relief of symptoms after discontinuing Fosamax, others have reported that the pain continued.
- The risk factors for and incidence of severe musculoskeletal pain associated with Fosamax are unknown.

Perhaps its not as large a problem as it looks?

- This analysis included 32,944 women (mean age, 64 years) who filled a new prescription for daily or weekly alendronate ($n = 26,581$) or risedronate ($n = 6,363$). Overall risk of adherence failure was 47% at 3 months, 70% at 1 year, and 84% at 3 years. At 3 years, only 37% of women were mildly compliant and 21% of women were persistent.
- **Approx 3/4 of women who initiate osteoporosis drug therapy are non-adherent with treatment within 12 months.**
- Osteoporosis International Volume 19, Number 10 1421-1429.

Two facts you need to know:

- Since 2001 more than 2,400 patients taking bone building medications have reported cases of osteonecrosis.
- An additional 120 people who were taking bisphosphonates have reported suffering from bone, joint or muscle pain leaving them bedridden or in need of walkers, crutches or wheelchairs.
- Bisphosphonates have been shown by several independent studies to only increase bone density by 1-2%. Company sponsored studies report a range of 2.8%-5.2% increase in bone density for Fosamax.



What will you do now?

With the information that you have just learned, the possibility exists that you can save many people from unnecessary pain and dysfunction... including **yourself!**



What you can do right now!

- Consume a diet rich in fresh vegetables & fruit and low in animal proteins
- Use a high quality, food based vitamin & mineral supplement which includes trace minerals & healthy oils
- Engage in physical activity, weight bearing exercise
 - 1 hour of moderate activity 3 times per week
 - Start slow!
- Eliminate:
 - Soda, Coffee, Alcohol
 - Smoking
 - Junk food, highly processed foods and refined sugar
- Avoid oyster-shell and coral calcium sources of Ca⁺ (high heavy metal content)
- Have Vitamin D (ideal 60-100 ng/mL), estrogen and PTH levels tested.





Practical Tips to Reduce the Risk of Falls

- Improve balance and muscle strength – consider Tai Chi, Quigong, or Yoga
- Get your vision tested once a year
- Review medication side effects and drug interactions (talk to your pharmacist), look for drugs or drug combinations which may cause dizziness or make you tired or disoriented
- Trip-proof your house – what can you do to make your house safer?

**“By nature, men are nearly alike; by
practice they get to be wide apart.”**

Confucius (551- 479 B.C.)





Need Help? Contact Us!

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