JANUARY 14, 2023 —- NYSAFP WINTER WEEKEND & SCIENTIFIC ASSEMBLY

OUR POROUS RECOGNITION OF OSTEOPOROSIS

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LEARNING OBJECTIVES

- Review Epidemiology/Economic Impact of Fragility Fractures
- Define Osteopenia and Osteoporosis based on T-Score
- Understand the Clinical Presentation of Osteopenia/Osteopor
- Describe the Components of Diagnostic Testing for Osteopen
- Describe the Role of Vitamin D Testing in the Treatment of Os
- Describe Treatment Options for Osteopenia and Osteoporosis
- List Potential Long-term Follow-up Strategies for Patients with Osteoporosis

EPIDEMIOLOGY/ECONOMIC IMPACT

EPIDEMIOLOGY & ECONOMICS

- Most common metabolic bone dz in the US (54 million).
- Affects 200 million people worldwide.
- Incidence increases with increasing age.
- 50% of all postmenopausal women have an osteoporosis-related fx during their lifetime.
- Human Cost (per International Osteoporosis Foundation)
  - Reported mortality of 20-24% in 1st yr after hip fracture.
  - 40% unable to walk independently; 60% require assistance 1 yr later.
  - Estimated 33% totally dependent or in SNF 1 yr after hip fx.

Cotts KG, Cifu AS. Treatment of Osteoporosis. *JAMA*. 2018;319(10):1040–1041.

DEFINITIONS

OSTEOPENIA vs OSTEOPOROSIS

Osteopenia: Think of osteopenia as "pre-osteoporosis"

- **Definition: T-score -1.01 to -2.49**
- **Majority of the population has osteopenia, not osteoporosis.**
- **Key Points:**
- ***Individuals with osteopenia have up to 80% risk for fragility fractures.***
- ***Diagnosis of osteopenia presents an opportunity for health care workers to intervene.***

OSTEOPENIA IS CLINICALLY SILENT.

INDIVIDUALS ARE ASYMPTOMATIC UNTIL A FRACTURE OCCURS. IDENTIFICATION OF THOSE AT RISK IS UP TO HEALTHCARE WORKERS.

OSTEOPOROSIS

- **Osteoporosis (greek= weak bones):**
  - **Systemic skeletal disease characterized by decreased bone mineral density (BMD).**
  - **Definitions:**
    - **T-score -2.50 or less, or**
    - **History of a fragility fracture, or**
    - **Osteopenia (T-score -1.10 to -2.49) + fragility fracture, or**
    - **Osteopenia + increased risk of fragility fracture as defined by a validated fracture risk assessment tool (e.g. FRAX, SCORE, ORAI, OST, OSIRIS)**

Key Points: **there are multiple ways to define/diagnose osteoporosis**

DEXA CRITERIA FOR OSTEOPOROSIS DX

Table 1. World Health Organization Bone Densitometry Criteria for Diagnosing Osteoporosis

Category	T-Score*
Normal	−1.0 or greater
Low bone mass (osteopenia)	Between −1.0 and −2.5
Osteoporosis	−2.5 or less

*T-score is the number of standard deviation units above or below the mean average bone mineral density value for a healthy young adult.

Data from World Health Organization. Assessment of fracture risk and its application to screening for postmenopausal osteoporosis: report of a WHO study group. WHO Technical Report Series 843. WHO; 1994. Accessed May 18, 2021. https://apps.who.int/iris/bitstream/handle/10665/39142/WHO_TRS_843_eng.pdf

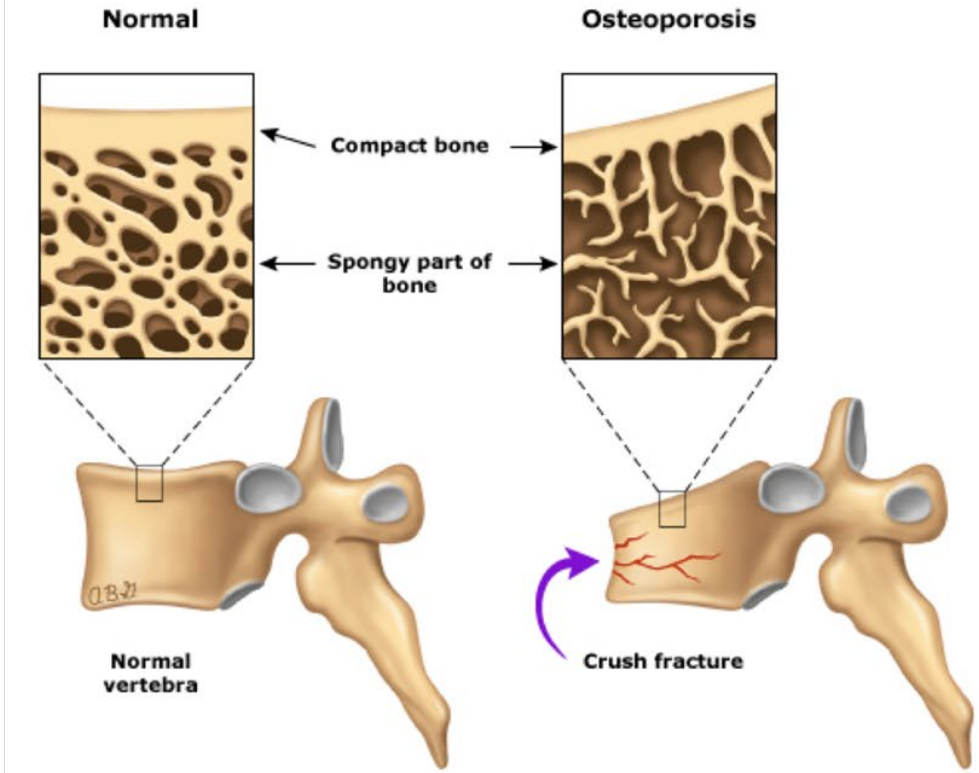
ACOG Clinical Practice Guidelines for Osteoporosis; September 2021

FRAGILITY FRACTURE

- Definition: atraumatic or low-velocity bone fracture.
- Most common locations: vertebral, hip, humeral, radial.
- Presentation may be occult — obtain x-ray when clinical suspicion is high.

ANATOMY

- Cortical bone: external layer. Dense. Compact. Strong.
- Cancellous (trabecular/ spongy): light-weight, internal, porous “structure” of the bone. Highly vascularized. Flexible.



TYPES OF OSTEOPOROSIS

- Primary osteoporosis: both sexes. Women = often menopausal. Men = often older (age 70 and above).

- Secondary osteoporosis: occurs secondary to medications, other physiological conditions, or diseases (i.e. chronic steroid therapy, hypogonadism, celiac disease, etc).

CAUSES OF SECONDARY OSTEOPOROSIS

- **Endocrine: DM, hyperparathyroid, hyperthyroid, hypogonadism, Cushing's**
- **GI: malnutrition/absorption, EtOH, celiac disease, s/p gastric bypass**
- **Heme: blood malignancies, sickle cell, hemophilia**
- **Medications…**

MEDICATION RECONCILIATION

- Alcohol
- Anticonvulsants
- Antipsychotics
- Corticosteroids
- Heparin
- Lithium
- Nicotine
- PPIs
- SSRIs

EARLY RECOGNITION IS IMPORTANT.

PROVIDES US THE BEST CHANCE TO SCREEN EARLY, IDENTIFY DISEASE, AND TREAT.

CLINICAL PRESENTATION

CLINICAL PRESENTATION

- **Recall: Osteopenia is clinically silent.**

- ***Screening informs diagnosis, which informs treatment — so who to screen?***

POLL

All women should receive baseline DEXA testing at age 50 for osteoporosis.

a. True

a. False

Osteoporosis screening recommendations

National Osteoporosis Foundation (NOF)	The NOF recommends measurement of BMD (DXA of the hip and spine) in[1]: • Women age 65 years and older and men age 70 years and older, regardless of clinical risk factors. • Younger postmenopausal women, women in the menopausal transition, and men age 50 to 69 years with clinical risk factors for fracture. • Adults who have a fracture after age 50 years. • Adults with a condition (eg, rheumatoid arthritis) or taking a medication (eg, glucocorticoids in a daily dose ≥5 mg prednisone or equivalent for ≥3 months) associated with low bone mass or bone loss.

International Society for Clinical Densitometry (ISCD)	The ISCD recommends measurement of BMD (DXA of the hip and spine) in[2]:
	• All women age 65 years and older and men age 70 years and older regardless of risk factors.
	• Postmenopausal women and men age 50 to 70 years when risk factors are present.
	• Adults with a fragility fracture.
	• Adults with a condition or taking a medication associated with low bone mass or bone loss.
	• Anyone being considered for pharmacologic therapy for osteoporosis.
	• Anyone being treated for osteoporosis to monitor response to therapy.
	• Anyone not receiving therapy when evidence of bone loss would lead to treatment.
	• Women in the menopausal transition if there is a specific risk factor associated with increased fracture, such as low body weight, prior low-trauma fracture, or high-risk medication.
	• Postmenopausal women discontinuing estrogen should be considered for bone density testing.
	• The 33% forearm (one-third radius) site is recommended in the following cases:
	  ◦ If hip and/or spine cannot be measured or interpreted
	  ◦ Hyperparathyroidism
	  ◦ Severe obesity (over the weight limit of DXA table)

Association of Clinical Endocrinologists (AACE)	AACE recommends measurement of BMD (DXA) in[3]: • All women age 65 years and older. • Any adult with a history of fracture not caused by severe trauma. • Younger postmenopausal women with clinical risk factors for fracture. • The lumbar spine (PA) and proximal femur are recommended sites of measurement.
United States Preventive Services Task Force (USPSTF)	USPSTF recommends measurements of BMD in[4]: • All women age 65 years and older. • In addition, they recommend screening in younger women whose fracture risk is equal to or greater than that of a 65-year-old White woman who has no additional risk factors. • The best site to screen is not mentioned, although the report agrees that DXA of the hip is the best predictor of hip fracture.
American Academy of Family Physicians (AAFP)	The AAFP recommends measurement of BMD in[5]: • Women age 65 years and older. • Women age 60 years and older at increased risk for osteoporotic fracture.
National Institutes of Health (NIH)	The NIH recommends[6]: • BMD measurements for individuals at high risk for osteoporosis. They do not recommend universal screening.
North American Menopause Society (NAMS)	The NAMS recommends measurement of BMD (DXA) in[7]: • Women age 65 and older. • Postmenopausal women with medical causes of bone loss or clinical risk factors for fracture, regardless of age. • Postmenopausal women with a fragility fracture.
American College of Preventative Medicine (ACPM)	The ACPM recommends measurement of BMD (DXA) in[8]: • Women age 65 and older. • Men age 70 and older. • Younger postmenopausal women and men aged 50 to 69 years with additional clinical risk factors for fracture.
American College of Obstetrics and Gynecology (ACOG)	The ACOG recommends measurement of BMD (DXA) in[9]: • Women age 65 and older. • Women under age 65 with additional clinical risk factors for fracture. • Alternatively, women under age 65 with FRAX 10-year risk of major osteoporotic fracture of 9.3% or higher.
UK National Osteoporosis Guideline Group (NOGG)	The NOGG does not recommend population screening. They are in favor of performing BMD measurements using a case-finding strategy based upon age-specific fracture probability thresholds[10].
Canadian Osteoporosis Society	The Canadian Osteoporosis Society recommends BMD measurement in[11]: • Postmenopausal women age 65 years and older. • Men age 65 years and older. • Younger men and women with additional clinical risk factors for fracture.

BMD: bone mineral density; DXA: dual-energy x-ray absorptiometry; FRAX: Fracture Risk Assessment Tool.

References:

1. *National Osteoporosis Foundation. 2013 Clinician's Guide to Prevention and Treatment of Osteoporosis. http://nof/public/content/resource/913/files/580.pdf (Accessed on November 14, 2013).*
2. *International Society for Clinical Densitometry. 2013 ISCD Official Positions - Adult. www.iscd.org/official-positions/2013-iscd-official-positions-adult/ (Accessed on November 14, 2013).*
3. *American Association of Clinical Endocrinologists Medical Guidelines for Clinical Practice for the Diagnosis and Treatment of Postmenopausal Osteoporosis. www.aace.com/pub/pdf/guidelines/OsteoGuidelines2010.pdf (Accessed on January 10, 2011).*
4. *US Preventive Services Task Force, Curry SJ, Krist AH, et al. Screening for Osteoporosis to Prevent Fractures: US Preventive Services Task Force Recommendation Statement. JAMA 2018; 319:2521.*
5. *American Academy of Family Physicians. Recommendations for clinical preventative services. www.aafp.org/exam.xml (Accessed on January 10, 2011).*
6. *www.consensus.nih.gov (Accessed on January 10, 2011).*
7. *Management of osteoporosis in postmenopausal women: the 2021 position statement of The North American Menopause Society. Menopause 2021; 28:973.*
8. *Lim LS, Hoeksema LJ, Sherin K. Screening for osteoporosis in the adult U.S. population: ACPM position statement on preventive practice. Am J Prev Med 2009; 36:366.*
9. *Committee on Practice Bulletins-Gynecology, The American College of Obstetricians and Gynecologists. ACOG Practice Bulletin N. 129. Osteoporosis. Obstet Gynecol 2012; 120:718.*
10. *National Osteoporosis Guideline Group (NOGG). www.shef.ac.uk/NOGG/index.html (Accessed on June 29, 2011).*
11. *Papaioannou A, Morin S, Cheung AM, et al. 2010 Clinical practice guidelines for the diagnosis and management of osteoporosis in Canada: Summary. CMAJ 2010; 182:1864.*

SCREENING RECOMMENDATIONS:

Choosing Wisely 2018 Guidelines:

- **Grade B recommendations:**
  - **Women age 65 and older with DEXA**
  - **Postmenopausal women younger than age 65 with DEXA if:**
    - **At increased risk of osteoporosis (apply FRAX, etc)**
    - **Clinical suspicion of fragility fracture**

Bone-Density Tests: When you need a test and when you don't.
Choosing Wisely, patient resources: https://www.choosingwisely.org/patient-resources/bone-density-tests/

DEMOGRAPHICS

- **Older/Elderly adults (women 65 and older, men 70 and older)**
- **European and Asian ancestry = *increased* risk (but don't forget other patients of color)**
- **Prolonged immobility (dementia, wheelchair dependent, bed bound)**
- **Chronic calorie deficits (i.e. restrictive eating disorder, elite female athlete)**
- **Postmenopausal status (including premature ovarian failure)**

SCREENING FOR MALES..

USPSTF: “The current evidence is insufficient to assess the balance of benefits and harms of screening for osteoporosis to prevent osteoporotic fractures in men.”

…But don’t lose hope, male friends!

Case… 69 yo male with back pain

Case MRI- lumbar

IMPRESSION

IMPRESSION: There is moderate to severe spinal stenosis due to a combination of disc bulge and ligamentum flavum hypertrophy, facet hypertrophy and underlying congenital spinal stenosis at L2-3. This is not significantly changed from 2019.

Interval increase in left lateral recess stenosis at L3-4 due to disc bulge and facet hypertrophy when compared to 2019.

Severe bilateral foraminal narrowing at L5-S1 secondary to endplate and facet hypertrophy unchanged from 2019. Please see above for additional detail.

CLINICAL HISTORY: Osteopenia.

COMPARISON: None available.

TECHNIQUE: Dual energy x-ray absorptiometry performed on the bilateral hips.

FINDINGS:

Bilateral hip: In the total bilateral hip, the bone density equals 0.993 and 1.000 g/cm2 on the left and right respectively. This corresponds to a T-score of -1.4 and -0.7 and Z-score of -0.7 and 0.0 on the left and right respectively.

Femoral neck: In the region of the femoral neck, the bone mineral density equals 0.727 and 0.883 g/cm2 on the left and right respectively. This corresponds to a T-score of -2.6 and -1.4 and Z-score of -1.4 and -0.2 on the left and right respectively.

IMPRESSION: Bone density values compatible with osteoporosis.

10 year probability of a major osteoporotic fracture of 9.7% and hip fracture of 3.0%.

According to the World Health Organization criteria for diagnosis osteoporosis:

T-score measurements greater than -1 are within normal limits.

Z -score measurements greater than -2 are within the expected range for age.

WHEN TO SCREEN MALE PATIENTS

- American Endocrine Society recommends screening for:
    - Age 70 and older
    - Age 50-68 who are at increased risk
        - Low body weight
        - Previous fracture
        - Chronic smoking history

- Males should be screened with axial DEXA.

SCREENING TRANSGENDER PATIENTS

- **Weak evidence suggests that agonadal states contribute to an increased risk of osteoporosis, however long term studies are lacking.**
- **There is insufficient evidence to guide recommendations for bone density testing in transgender women or men.**

- Transgender people (regardless of birth-assigned sex) should **begin bone density screening at age 65.**
- Screening between **ages 50 and 64 should be considered for those with established risk factors for osteoporosis.**

- **Transgender people (regardless of birth assigned sex) who have undergone gonadectomy and have a history of at least 5 years without hormone replacement should also be considered for bone density testing, regardless of age, birth-assigned sex, or gender identity (Grading: X C W)**

Source: transcare.uscf.edu

BASIC WORKUP/ DIAGNOSTIC TESTING

H&P

- Potentially modifiable risk factors:
  - Current cigarette smoking
  - Low body weight (BMI)
  - Estrogen deficiency (including menopause, early menopause, history of bilateral oophorectomy, amenorrhea >1 year in premenopausal patient, etc)
  - Low calcium/Vitamin D intake
  - Alcoholism (3/d)
  - Sedentary lifestyle
  - Poor health/fragility

H&P CONT…

- Non-modifiable risk factors:
  - History of fracture as an adult (especially low-velocity)
  - History of fragility fracture in 1st degree relative
  - White race
  - Advanced age (>50 yrs)
  - Female sex
  - Dementia (especially if sedentary, poor nutrition, etc).
  - Poor health/fragility

BASIC LABS

- CBC
- Ca, Phos, Cr, eGFR, ALP, LFTs
- TSH, fT4
- Urine studies: 24h urine Ca, Cr, Na
- Total testosterone
- Vitamin D

IMAGING:

- **X-ray**
  - **Best predictor of fragility fracture is a previous history of fragility fracture.**
  - ****Remember these fractures may be occult — obtain X-ray if high clinical suspicion.**
    - **Vertebral compression fractures = most common.**

WHO GETS SCREENING X-RAYS?

- **Vertebral imaging should be performed in:**
  - **Women age 65-69 and men age 70-79 with T-score -1.50 and lower**
  - **Women age 70 and older; men aged 80 and older with T-score -1.01 to -2.49.**
  - **Postmenopausal women and men with:**
    - **History of fragility fracture in adulthood**
    - **Historical height loss of 1.5 inches or more**
    - **Prospective (measured) height loss of 0.8 inches or more**
    - **Current long-term steroid use**

DEXA

Dual Energy X-ray Absorptiometry

- **Measures bone composition/mineral density; uses 2 different low-energy X-ray beams.**
  - **Axial (central) - measures lower spine + hip**
  - **Peripheral - measures hand/wrist, leg/heel**

- **Study takes approximately 10 - 20 min.**
- **Patients need to hold calcium supplements 24h prior to testing (ingestion may interfere with DEXA readings).**

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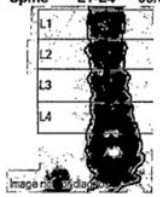
Your patient [redacted] completed a BMD test on 09/09/2022 using the Lunar Prodigy DXA system manufactured by GE Healthcare. The following summarizes the results of our evaluation.

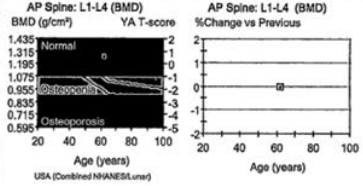
PATIENT BIOGRAPHICAL:

NAME: [redacted] **DOB:** [redacted]
INDICATIONS: Post Menopausal
HT: 65.0 in. **WT:** 162.0 lbs. **TREATMENTS:** Vitamin D

DENSITOMETRY RESULTS:

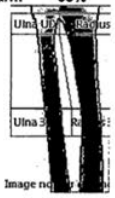
Site	Region	Measure Date	Patient Age	WHO Classification	T-Score	AM Z-Score	BMD	% Change Previous
AP Spine	L1-L4	09/09/2022	61.9	Normal	0.6	1.6	1.267 g/cm²	-

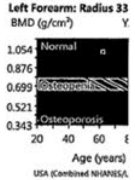


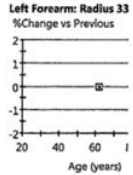


L1	0.2	1.3	1.170 g/cm²
L2	0.0	1.1	1.214 g/cm²
L3	0.8	1.7	1.295 g/cm²
L4	1.1	2.1	1.357 g/cm²

Site	Region	Measure Date	Patient Age	WHO Classification	T-SCORE	AM Z-SCORE	BMD	% Change Previous
Left Forearm	Radius 33%	09/09/2022	61.9 years	Normal	1.7	2.8	1.026 g/cm²	-







Radius Total	1.9	2.9
Radius UD	1.1	2.2

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09/09/2022

INTERPRETATION:

Compared to the Young-Normal reference this study indicates **Normal bone mass of the AP Spine and Normal bone mass of the Left Forearm**

FOLLOW-UP:

People with diagnosed cases of osteoporosis or at high risk for fracture should have regular bone mineral density tests. For patients eligible for Medicare, routine testing is allowed once every 2 years. The testing frequency can be increased to one year for patients who have rapidly progressing disease, those who are receiving or discontinuing medical therapy to restore bone mass, or have additional risk factors.

Based on these results, a follow upexam is recommended in September 2024.

Sincerely,

[redacted]

[redacted]

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Result for comparison is available.

Results History

(SJIA or External)DXA Bone Density Axial Skeleton (Order 348666428)

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Narrative & Impression

CLINICAL HISTORY: Screening. Osteoporosis. Personal history of tobacco use. Postmenopausal.

COMPARISON: 5/28/2019.

TECHNIQUE: Dual energy x-ray absorptiometry performed on the lumbar spine and hip.

FINDINGS: Lumbar spine: In the region of the L1-L4, the bone mineral density equals 0.846 g/cm2. This corresponds to a T-score of -2.8 and Z-score of -1.8. This is a 3.5% decrease since the previous exam.

Left hip: In the total left hip, the bone density equals 0.757 g/cm2. This corresponds to a T-score of -2.0 and Z-score of -1.3. This is an 8.6% increase since the previous exam.

Femoral neck: In the region of the femoral neck, the bone mineral density equals 0.715 g/cm2. This corresponds to a T-score of -2.3 and Z-score of -1.4.

IMPRESSION: This patient is considered osteoporotic according to World Health organization criteria. Fracture risk is high with a 10 year probability of a major osteoporotic fracture of 24.4% and hip fracture of 9.7%.

According to the World Health Organization criteria for diagnosis osteoporosis:

T-score measurements greater than -1 are within normal limits.

Z-score measurements greater than -2 are within the expected range for age.

Dictated by: [redacted] 09/28/2022
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Transcribed by: MHon <<09/28/2022 11:35 AM>>

CDS G Code:

DEXA CONT...

- **T-score: compares patient's BMD to healthy, same-sex control with peak bone mass.**
  - **Normal: score of -1 and above.**
  - **Osteopenia: score of -1.01 to -2.49.**
  - **Osteoporosis: score of -2.5 and below (more negative).**

- **Estimates fracture risk; provides indication to start bone resorptive therapy.**
- **Not useful in women younger than 65/men younger than 70 without risk factors.**

WHAT ABOUT VITAMIN D?

VITAMIN D: SCREENING RECOMMENDATIONS

- **<u>DO NOT SCREEN ASYMPTOMATIC PATIENTS</u> — there is no benefit/utility**
- **Check Vit D Level in the following:**
  - **Adult with hx of fall, fracture, fragility fracture**
  - **Elderly with risk of fall**
  - **Renal dz**
  - **Osteoporosis dx**
  - **Low sun exposure**
  - **Obesity**

VITAMIN D: SUPPLEMENTATION

- **Dose: Vitamin D3 800 - 1000 IU daily.**

- **International Osteoporosis Foundation:**
  - **Goal level of at least 30 ng/mL.**

VITAMIN D IN BONE MINERAL DISEASE

- Low Vit D level prior to osteoporosis treatment leads to:
  - Decreased response to treatment
  - Impaired bone remodeling
  - Impaired Ca homeostasis
  - Compensatory rise in PTH
  - Excessive bone resorption!

CHECK VITAMIN D PRIOR TO STARTING BISPHOSPHOTATES.

OR RISK FURTHER DECREASE IN BMD! **GOAL 30 OR GREATER.**

TREATMENT

OSTEOPENIA: NON-PHARMACOLOGIC TREATMENT

- **Lifestyle modifications (applicable to all osteopenia pts)**
  - **Weight-bearing exercises (walking, resistance training)**
  - **Smoking cessation**
  - **Avoid excessive EtOH intake (>2 drinks/day)**
  - **Vitamin D + Calcium supplementation (dietary is best)**

OSTEOPENIA: PHARMACOLOGIC TREATMENT

- Controversial…
  - Available studies have unclear/conflicting data.
  - Cost of tx may outweigh an only modest potential benefit.
  - In practice, consider the following prior to pharm tx:
    - Lifestyle modifications/counseling + repeat DEXA as indicated
    - Individual risk factors (i.e. long-term steroid use)
    - Fracture risk assessment (FRAX score, etc)- 10 yr risk over 3% hip or 20% overall

BISPHOSPHONATE THERAPY

- **Recommended as initial treatment to reduce fracture risk.**
- **MOA: Inhibits bone resorption by inhibiting osteoclast activity; indirectly increases BMD.**

- **Meds:**
  - **Oral: alendronate, risedronate, ibandronate**
  - **IV: zoledronic acid 5 mg yearly**
- **Treat for min 5 years.**
- **“Drug holiday” of 3-5 years is appropriate (until significant loss of BMD or fracture)**
  - **Check DEXA q2-4 years to evaluate BMD during drug holiday.**

BISPHOSPHONATES: CONTRAINDICATIONS

- **Hx of allergy/hypersensitivity**
- **Hypocalcemia**
- **CKD with GFR <35 mL/min; acute renal impairment**
- **History of atypical femur fx or osteonecrosis of the jaw**

- ***Note: low Vitamin D is not a contraindication! …Make sure Vitamin is adequately replaced prior to starting bisphosphonate.***

BISPHOSPHONATES cont…

- **Avoid oral form in patients with:**
  - **Esophageal disorders (achalasia, stricture, varices, Barrett's)**
  - **S/p bariatric surgery**
  - **Inability to stand/sit upright for 30 min after taking**
  - **Moderate-severe cognitive impairment/dementia**
    - *******<u>consider</u> intravenous zoledronic acid instead!***

OSTEOPOROSIS TREATMENT cont...

- Denosumab
  - RANKL Inhibitor: prevents osteoclast formation
  - Alternative to bisphosphonate tx.

  - Recommended for males receiving androgen deprivation tx for prostate ca.
  - Contraindicated if Ca levels are low

  - Potential SE: risk of rapid bone loss after discontinuation; increased risk of infection / neoplastic complications (studies pending)

OSTEOPOROSIS TREATMENT cont…

- Other targeted treatments:
  - PTH/PTH-rp analogs: Taraparatide; abaloparatide
  - SERMs: Raloxifene
  - Hormonal tx:
    - Estrogen/testosterone if indicated symptomatically (menopause/hypogonadism)

LONG TERM FOLLOW-UP

LONG-TERM FOLLOW-UP/MONITORING

- **For Normal BMD/Low fracture risk**
  - **North American Menopause Society: no benefit to repeating DEXA prior to 2-5 yrs.**
  - **USPSTF: no benefit in repeating exam prior to 4-8 years.**
    - **Longitudinal study showed progression to osteoporosis took:**
      - **15 yrs, if initial BMD normal or mild osteopenia (T score -1 .01 to -1.49)**
      - **5 yrs, if initial BMD showed moderate osteopenia (T score -1.5 to -1.99)**
      - **1 yr, if initial BMD showed advanced osteopenia (T score -2 to -2.49)**
  - **ACOG:**
    - **Repeat testing should be performed no sooner than 2 years after initial screening.**
      (CONDITIONAL RECOMMENDATION, LOW-QUALITY EVIDENCE)
    - **Plan to repeat DEXA when initial BMD is near tx threshold, or with significant change in risk factors placing them at risk for accelerated bone loss.**

FOLLOW-UP/MONITORING

- **Monitoring patients on treatment … sort of unclear.**
  - **American College of Physicians: Treat for 5 years; no monitoring (do not obtain DEXA) during that time.**
  - **American College of Endocrinology: Obtain baseline DEXA; repeat study every 1-3 years until findings are stable vs improved.**

Richard Eastell, Clifford J Rosen, Dennis M Black, Angela M Cheung, M Hassan Murad, Dolores Shoback, Pharmacological Management of Osteoporosis in Postmenopausal Women: An Endocrine Society Clinical Practice Guideline, *The Journal of Clinical Endocrinology & Metabolism*, Volume 104, Issue 5, May 2019, Pages 1595–1622

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DURATION OF THERAPY…also controversial

- Endocrine Society Clinical Practice Guidelines (2019)
  - 3-5 years of treatment = highly beneficial/low risk
  - Treatment duration based on multiple factors:
    - Individual's fracture risk, treatment modality, risk of AE (AFF, ONJ, etc)
  - Bisphosphonates are the only treatment shown to have longer lasting effects after discontinuation
    - Drug holidays ok
  - Non-bisphosphonate therapies
    - Effects disappear with discontinuation of therapy.
    - denosumab - increased risk of fx = unclear of return to baseline vs "rebound" effect

Richard Eastell, Clifford J Rosen, Dennis M Black, Angela M Cheung, M Hassan Murad, Dolores Shoback, Pharmacological Management of Osteoporosis in Postmenopausal Women: An Endocrine Society Clinical Practice Guideline, The Journal of Clinical Endocrinology & Metabolism, Volume 104, Issue 5, May 2019, Pages 1595–1622

OTHER CONSIDERATIONS

- **Generally:**
  - **If T-score remains in osteoporotic range at follow-up, consider changing therapeutic class (ex. Bisphosphonate to Denosumab)**
  - **Repeat exams should be done on same DEXA machines (even same technologist), to decrease error between exams.**

CASE STUDY

CASE:

60 y/o Caucasian female with history of premature ovarian failure at age 40; admits to history of bulimia as youth and young adult. Denies history of falls/fractures.

Presents to your office for regular follow-up visit. No complaints.

CASE: RISK FACTORS

- Caucasian (increased risk)
- Age 60, but history of premature ovarian failure (menopausal)
- History of calorie-restricting eating disorder for several years

CASE: SCREENING RECOMMENDATIONS

- **USPSTF, ACOG, AAFP, Endocrine Societies all in agreement:**

Recommendation Summary

Population	Recommendation	Grade
Women 65 years and older	The USPSTF recommends screening for osteoporosis with bone measurement testing to prevent osteoporotic fractures in women 65 years and older.	B
Postmenopausal women younger than 65 years at increased risk of osteoporosis	The USPSTF recommends screening for osteoporosis with bone measurement testing to prevent osteoporotic fractures in postmenopausal women younger than 65 years who are at increased risk of osteoporosis, as determined by a formal clinical risk assessment tool. See the Clinical Considerations section for information on risk assessment.	B
Men	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for osteoporosis to prevent osteoporotic fractures in men. See the Clinical Considerations section for suggestions for practice regarding the I statement.	I

CLINICAL HISTORY: Postmenopausal.

COMPARISON: 1/16/2019

TECHNIQUE: Dual energy x-ray absorptiometry performed on the lumbar spine and hip.

FINDINGS: Lumbar spine: In the region of the L1-L4, the bone mineral density equals 1.245 g/cm2. This corresponds to a T-score of 0.5 and Z-score of 2.2. There is been a 2.6% decrease in bone mineral density since the prior examination when measured at
L1 through L4.

Left hip: In the total left hip, the bone density equals 0.825 g/cm2. This corresponds to a T-score of -1.4 and Z-score of 0.0. There has been a 4.0% decrease in bone mineral density since the prior examination when measured for the total left hip.

Femoral neck: In the region of the femoral neck, the bone mineral density equals 0.798 g/cm2. This corresponds to a T-score of -1.7 and Z-score of -0.1.

This patient is considered osteopenic according to World Health organization criteria. Fracture risk is moderate.

IMPRESSION: This patient is considered osteopenic according to World Health organization criteria. Fracture risk is moderate with a 10 year probability of a major osteoporotic fracture of 16.5% and hip fracture of 3.1%.

According to the World Health Organization criteria for diagnosis osteoporosis:

T-score measurements greater than -1 are within normal limits.

Z-score measurements greater than -2 are within the expected range for age.

POLL:

What is this patient’s diagnosis?

A: Osteopenia

B: Osteoporosis

CASE: AXIAL DEXA RESULTS:

- **T score: -1.4 Hip; -1.7 Femoral Neck**
- **FRAX:**
  - **Risk of major osteoporotic fracture: 16.5%**
  - **Risk of hip fracture: 3.1%**

This patient <u>does</u> have osteoporosis.

…What do we do next?

CASE: TAKE-HOME POINTS

Recall there are different ways to define osteoporosis, including osteopenia + increased risk of fragility fracture as defined by validated fracture risk assessment tool.

Read and interpret your own DEXA results!

CASE: TREATMENT CONSIDERATIONS

- **Address modifiable risk factors:**
  - **Screen for ongoing eating disorder?**
  - **Recommend high-impact exercise/strength training**
  - **Dietary supplementation**
    - **Ca + Vit D (dietary preferred, supplements ok; note: no decrease in fracture risk!)**
- **Treat with pharmacotherapy:**
  - **Bisphosphonates - gold standard**
- **Follow-up:**
  - **5 years; sooner as needed/indicated**

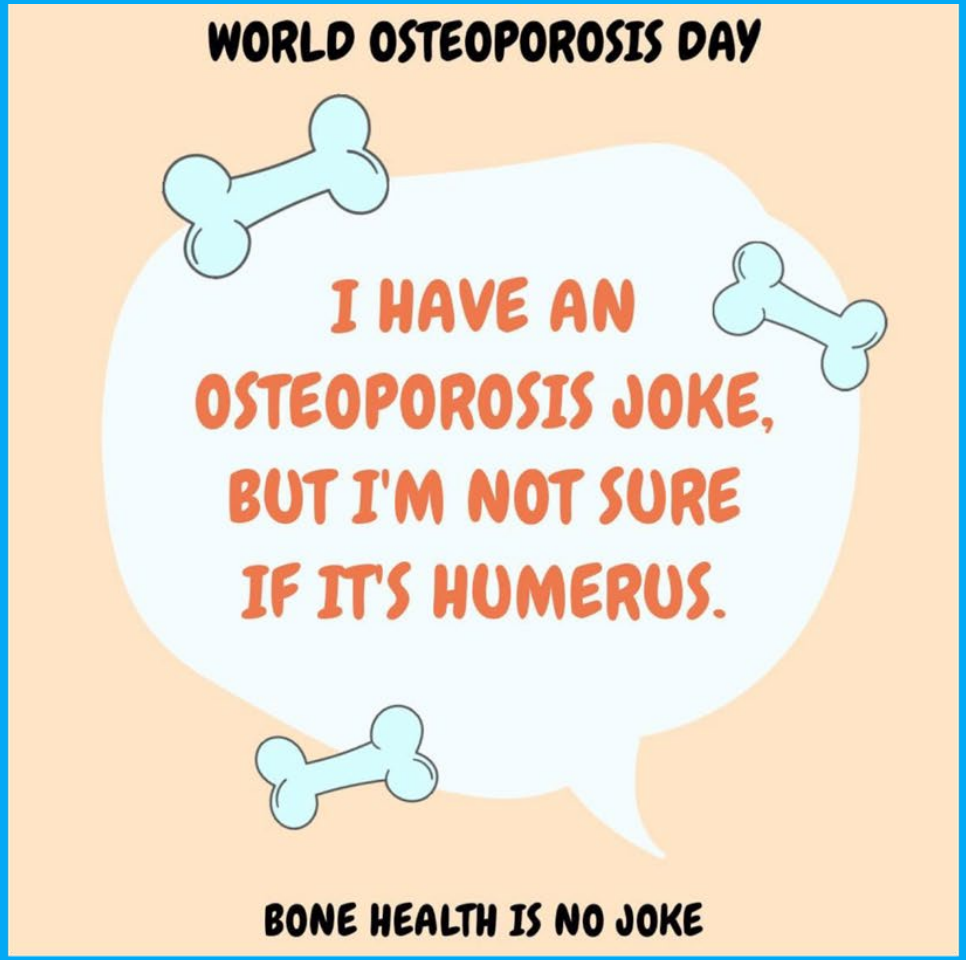
TREATMENT DISPARITIES - FOOD FOR THOUGHT

- **Per ACOG Clinical Practice Guidelines (September 2021):**
  - **Racial disparities in screening and treatment persist even after accounting for insurance/SES — suggests healthcare bias influenced clinical decision making.**
    - **Black women are less likely to be screened for osteoporosis vs women in other racial/ethnic groups.**
    - **Black and Hispanic women are less likely to undergo DEXA s/p hip fracture vs white women.**
    - **Study of primary care practice showed that black women were less likely than white women to receive treatment for osteoporosis after the diagnosis had been identified.**
    - **Secondary analysis of the REGARDS (stroke disparities) study revealed women identifying as African-American were less likely to receive therapy vs women who identified as Caucasian and Hispanic.**
  - **Consequence: higher rates of 1-year mortality, debility and destitution in black women vs white women.**

ACOG Clinical Practice Guidelines for Osteoporosis; September 2021

RECAP

- Majority of individuals with bone disease have osteopenia.
- Osteopenia + fragility fracture = osteoporosis.
- We can intervene on osteopenia with timely screening to prevent morbidity/mortality associated with fragility fractures.
- Vertebral x-ray is an important screening tool.
- Bisphosphonates are first line treatment.
- Goal Vitamin D level is > 30 prior to initiating bisphosphonate therapy.
- Treat osteoporosis for 5 years then reassess with DEXA. Repeat DEXA based on clinical concern every 1-5 yrs.
- Treatment should be selected based on potential benefits, harms, cost in the setting of patient preference and fracture risk profile.
- Please do not forget your patients of color or men.



WORLD OSTEOPOROSIS DAY: THURSDAY, 10/20/2023

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