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Comprehensive Approach to Bone Health

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Learning Objectives 2

1. Define osteopenia & osteoporosis
2. Describe the importance of the WHO Fracture Risk Calculator (FRAX) in determining who should get medication
3. Identify FDA-approved medications to reduce fracture risk & possible side effects

Sources for information:
Bone Health & Osteoporosis Foundation (BHO)
Clinicians Guide to Prevention and Treatment of Osteoporosis, Osteoporosis International 2022

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Osteoporosis: Causes 3

Disordered calcium balance
Medications
Endocrine conditions
Other

50+ conditions/diseases/medications:
Clinician's Guide to Prevention & Treatment of Osteoporosis, Osteoporosis International, 2022

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Assessment for Osteoporosis

Laboratory:
Electrolytes, kidney function
Blood count
Vitamin D



Clinician's Guide to Prevention & Treatment
of Osteoporosis, Osteoporosis International,
2022

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Physical Examination:

Emphasis on muscle strength & balance

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Radiology assessment

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X-ray
Bone Mineral Density (BMD)—many FDA approved
devices

Dual Energy X-ray Absorptiometry (DXA)



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World Health Organization Criteria for Osteoporosis 7

<u>Diagnosis</u>	<u>BMD T-score</u>
Normal	-1 to +1
Osteopenia	-1 to -2.5
Osteoporosis	-2.5 or more

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Recommendations: 8


Calcium intake 1200 mg/d for most adults
Vitamin D intake 800-1000 IU/d
(cholecalciferol; sun exposure)
Weight bearing exercise/physical therapy
Smoking cessation, moderate alcohol



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Prescription Medication: Who? 9

- ▶ Women & men 50 years & older if:
 - ▶ Hip or spine fracture
 - ▶ Osteoporosis in the hip or spine
 - ▶ Osteopenia but high 10-year risk of fracture using fracture risk assessment tool (FRAX®)



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Fracture Risk Assessment Tool (FRAX®)

Calculation Tool

Please answer the questions below to calculate the ten year probability of fracture with BMD.

Country: **US (Caucasian)** Name/ID: **Suzie Smith** About the risk factors

Questionnaire:

1. Age (between 40 and 90 years) or Date of Birth
 Age: Yr Mo Ds

2. Sex Male Female

3. Weight (kg) 59.9

4. Height (cm) 160

5. Previous Fracture No Yes

6. Parent Fractured Hip No Yes

7. Current Smoking No Yes

8. Glucocorticoids No Yes

9. Rheumatoid arthritis No Yes

10. Secondary osteoporosis No Yes

11. Alcohol 3 or more units/day No Yes

12. Femoral neck BMD (g/cm²)
 Hologic 0.50 T-score: -2.3

Clear Calculate

BMI: 23.4
 The ten year probability of fracture (%)

Major osteoporotic	16
Hip Fracture	5.3

If you have a TBS value, click here: [Adjust with TBS](#)

Weight Conversion
 Pounds kg
 122

Height Conversion
 Inches cm
 63

09519190
 Individuals with fracture risk assessed since 1st June 2011

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FDA Approved Treatment Options 11

Medications that shut down osteoclasts

1. Bisphosphonates (Fosamax®, Actonel®, Boniva®, Reclast®)
2. Denosumab (Prolia®)
3. Raloxifene (Evista®)
5. Estrogen --not FDA approved indication, but use if can't have other interventions

Medications that enhance osteoblasts

Forteo® or Tymlos® (recombinant parathyroid hormone or parathyroid related protein)

Romosozumab (Evenity®)

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Considerations for Therapy 12

- ▶ Bisphosphonates: GI issues, osteonecrosis of jaw (ONJ), atypical fractures
- ▶ Prolia® : low calcium, ONJ, rebound spine fractures
- ▶ Forteo® or Tymlos®: \$\$\$\$\$, risk of osteosarcoma if prior radiation, Paget's disease, still growing, bone metastases
- ▶ Evista®: no reduction of hip fracture
- ▶ Evenity®: used for high-risk patients, \$\$\$\$\$, ONJ, risk of heart attack or stroke, low calcium
- ▶ Estrogen: increases risk for blood clots

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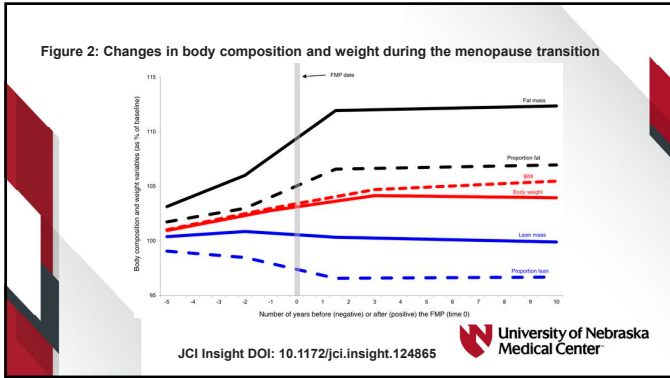
Important non-medical therapy

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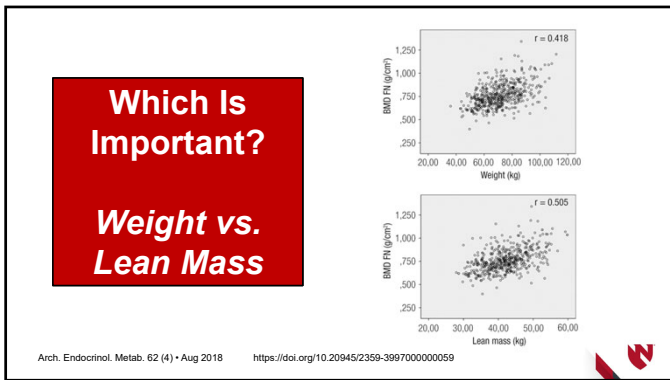
- ▶ Core strengthening, weight bearing → Laura Bilek, PhD

Thank you

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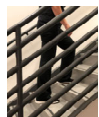


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How can women maintain lean mass (muscle) and bone during and after the menopause transition?

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BONE **IMPACT** Exercises

<u>Jumping Rope</u> 	<u>Lunges</u> 	<u>Calisthenics</u> 
<u>Hiking</u> 	<u>Stair Climbing</u> 	<u>Step Exercise Class</u> 

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BONE **RESISTANCE TRAINING** Exercises

<u>Free Weights</u> 	<u>Machines</u> 
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Exercise Prescription

Women at Risk



- Dose/Intensity
 - Resistance training for muscle STRENGTH (~70% 1 RM)
 - Volitional fatigue 8-12 reps
 - 1, 2 or 3 sets ?
- Frequency
 - Goal is 3 days/week

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Posterior Thoracic Exercise Prescription

OSTEOPOROSIS

Lower Trapezius

Shoulder External Rotators

Rhomboids

Middle Trapezius

Flys

Deltoids

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Exercise Precautions

DOs

Stand straight!
Stand tall - Keep your head above your shoulders
Keep your shoulders pulled back - like a military posture

DON'Ts

Don't slump!
Never bend at your spine to lean over to pick up objects
Even worse: never bend at your spine while twisting
Abdominal crunches

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Bone Health Research Opportunity:

The Spry Belt

PURPOSE:
Compare bone health in post-menopausal women who are randomized to an "active" Spry belt or an "inactive/placebo" Spry belt.

ELIGIBLE:

- One year after last menstrual cycle
- Has osteopenia or low bone mass
- Not taking medications which directly affect bone

SCREENING:
Women who meet the initial criteria will have a DXA scan to see if they have osteopenia

For more information:
<https://www.unmc.edu/alliedhealth/research/projects/sprybelt/index.html>
Study Phone Number: 402-559-6584

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