## Osteoporosis: Pathology, Assessment & Management (non-live)

### **Goals and Objectives**

### **Course Description**

"Osteoporosis: Pathology, Assessment & Management (non-live)" is an online recorded video of a previously presented live CE webinar for physical therapists and physical therapist assistants that presents contemporary information about osteoporosis. This course includes discussion of pathogenesis, etiology, diagnostic tests, pharmacological management, and therapeutic considerations for patients with this condition.

#### **Course Rationale**

The purpose of this course is to provide participants with contemporary information about the osteoporosis. Rehabilitation professionals can use this information when implementing their treatment programs to address the specific needs of individuals effected by this condition.

### **Course Goals and Objectives / Learning Outcomes**

Upon completion of this course, participants will be able to:

- 1. Compare normal bone development with skeletal fragility and bone loss.
- 2. Distinguish primary, secondary, juvenile, and organ transplant osteoporosis.
- 3. Describe pathogenesis of secondary osteoporosis and underlying disease mechanisms.
- 4. Identify common fractures associated with osteoporosis.
- 5. Distinguish diagnostic tests utilized for bone density measurement.
- 6. Identify clinical risk assessment tools to assess osteoporosis and fracture risk.
- 7. Detail screening indications, diagnostic classifications, and treatment thresholds.
- 8. Identify common adverse reactions from medications prescribed to manage osteoporosis.
- 9. Describe lifestyle and dietary modifications implemented to manage disease progression.
- 10. Identify fracture prevention strategies including use of fall risk assessment and benefits of exercise.

Course Provider – Innovative Educational Services

Provider Contact Information - information@cheapceus.com

Course Instructor - Jodi Gootkin, PT, MEd, CEAS

**Conflict of Interest** – No financial or non-financial conflict of interest exists for the presenter or provider of this course.

Target Audience - Physical Therapists, Physical Therapist Assistants

Course Educational Level – This course is applicable for introductory learners.

Course Prerequisites - None

Method of Instruction - Recorded on-demand video

Location - Cheapceus.com

Date - Available continuously on-demand

**Course Completion Requirements / Criteria for Issuance of CE Credits** – Viewing of the 3-hour recorded video in its entirety, and scoring 70% correct or greater on the course post-test

Continuing Education Credits - Three (3) contact hours

Course Fee - \$34.95

**Registration Information** – This activity is offered on-demand and does not require registration in advance by the learner. Learners may participate anytime in this activity by going to: cheapceus.com

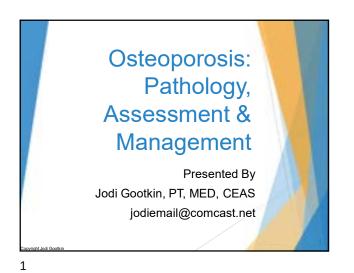
Special Needs Requests - Email: information@cheapceus.com or phone: 954-663-4101

Cancellation by the Learner – Learners may cancel their participation at any time and receive a full refund of all paid fees.

Cancellation by the Provider - Cancellation by the provider is not applicable as this activity is not a scheduled event

**Complaint Resolution** – Please call 954-663-4101 (24 hours/day, 7 days/week) to speak with a live custumer service agent. Our goal is to work with our customers to resolve all issues to the customer's satisfaction with just one phone call whenever possible.

**Refund Policy** - Unrestricted 100% refund upon request. The request for a refund by the learner shall be honored in full without penalty or other consideration of any kind. The request for a refund may be made by the learner at any time without limitations before, during, or after course participation.



## **Course Overview**

"Osteoporosis: Pathology, Assessment & Management" presents contemporary information about osteoporosis. This course includes discussion of pathogenesis, etiology, diagnostic tests, pharmacological management, and therapeutic considerations for patients with this condition.

### Course Rationale

The purpose of this course is to provide participants with contemporary information about the osteoporosis. Rehabilitation professionals can use this information when implementing their treatment programs to address the specific needs of individuals effected by this condition.

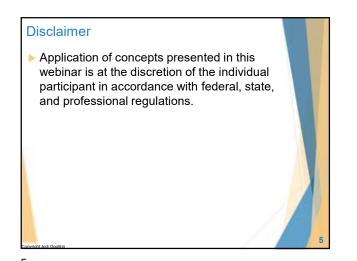
## Goals and Objectives

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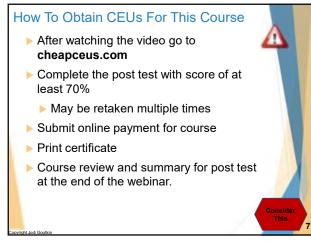
- Compare normal bone development with skeletal fragility and bone loss.
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- Describe pathogenesis of secondary osteoporosis and underlying disease mechanisms.
- 4. Identify common fractures associated with osteoporosis.
- Distinguish diagnostic tests utilized for bone density measurement.
   Identify clinical risk assessment tools to assess osteoporosis and fracture risk.
- Detail screening indications, diagnostic classifications, and treatment thresholds.
- 8. Identify common adverse reactions from medications prescribed to manage osteoporosis.
- Describe lifestyle and dietary modifications implemented to manage disease progression.
   Identify fracture prevention strategies including use of fall risk assessment and benefits of exercise.

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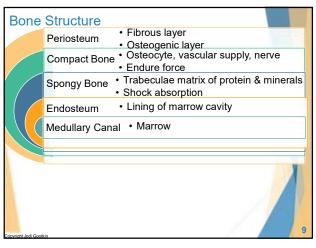


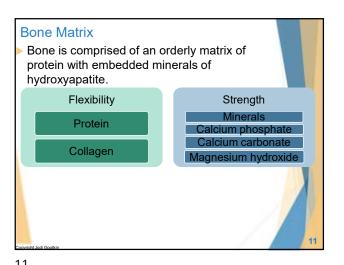
	Торіс	Time
	Healthy Bone Development	0:00-0:10
	Types of Osteoporosis	0:11-0:15
1.00	Risk Factors	0:16-0:20
2	Primary Pathogenesis	0:21-0:30
	Secondary Underlying Disease Pathogenesis	0:31-0:40
	Secondary Medication Associated	0:41-0:45
	Juvenile and Organ Transplant	0:46-0:50
Course Outline and	Interactive Discussion of Clinical Applications	0:51-0:60
Schedule	Consequences of Osteoporosis	1:00-1:05
Schedule	Fracture Related Morbidity and Mortality	1:06-1:10
	Vertebral and Hip Fracture	1:11-1:20
	Osteoporosis Screening	1:21-1:25
	Diagnostic Tests and Classifications	1:26-1:40
	Clinical Risk Assessment Tools	1:41-1:50
	Interactive Discussion of Clinical Applications	1:51-2:00
	Pharmacologic Management	2:01-2:05
Consider This	Medications and Adverse Effects	2:06 -2:15
	Supplements and Diet Recommendations	2:16-2:25
	Fall Risk Assessment and Management	2:26-2:35
	Exercise Considerations and Outcomes	2:36-2:50
	Interactive Discussion of Clinical Applications	2:51-3:00
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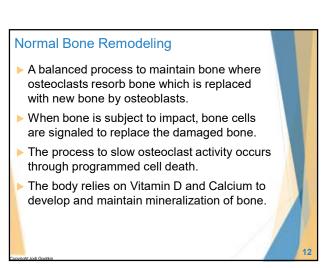
Osteoporosis: Pathology, Assessment & Management







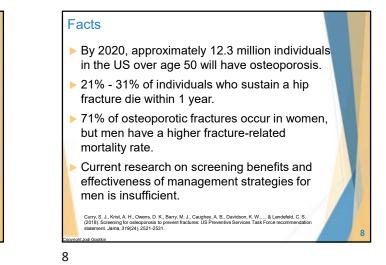




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 Types of Bone Cells

 • Produce osteoblast

 • Steoblast

 • Sorteogenic Cells

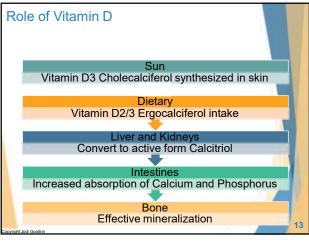
 • Osteocyte

 • Osteoclast

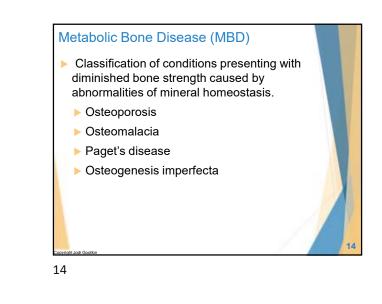
 • Osteoclast

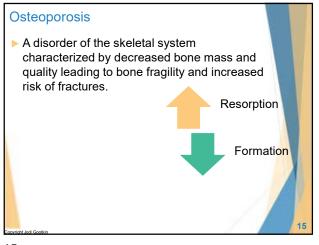
 • Steoclast

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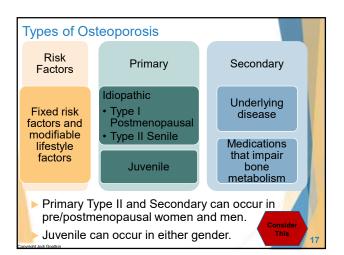




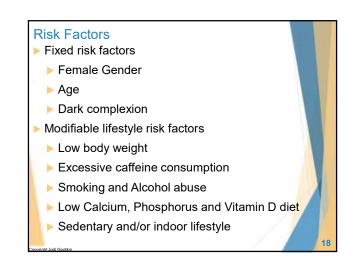




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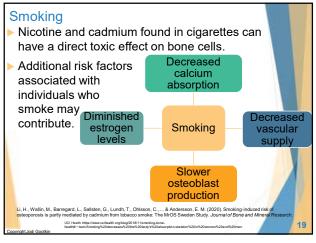


Abnormal Bone Remodeling High bone turnover occurs when resorption is greater than bone formation contributing to decreased bone strength. Decreased bone mass Altered bone Disrupted trabecular matrix composition architecture Decreased Increased cortical cortical thickness porosity 16

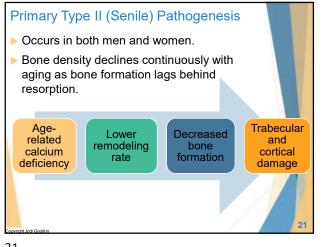


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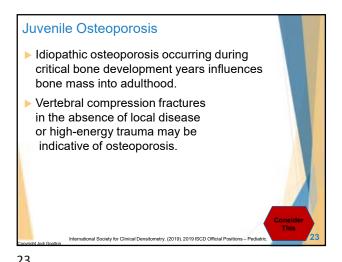
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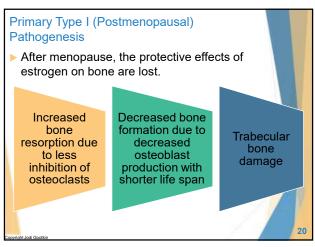


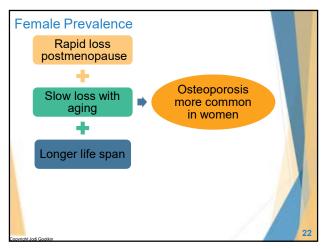




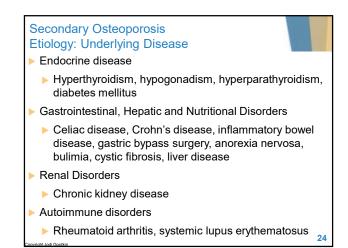
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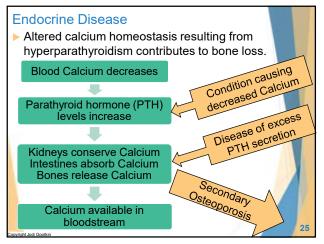


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# Obesity and Gastric Bypass Surgery

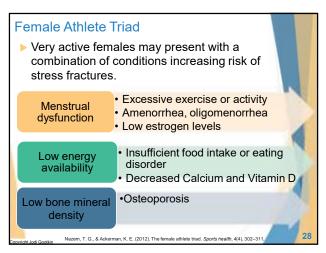
- Individuals who are obese may require larger than usual intakes of Vitamin D to achieve 25(OH)D levels compared to those of a healthy weight.
- Subcutaneous fat sequesters Vitamin D limiting bioavailability.
- With gastric bypass surgery, a segment of the upper small intestine where absorption occurs is bypassed.

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# Gastrointestinal Disease Individuals with ulcerative colitis,

- Individuals with dicerative colitis, Crohn's disease and Celiac disease present with mucosal inflammation which decreases absorption of Vitamin D and Calcium.
- Proinflammatory cytokines alter the ratio of osteoclast activating and blocking mediators shifting bone metabolism to favor resorption.
- Effects of long-term glucocorticoids used to manage inflammation.

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Chronic Kidney Disease – Mineral and Bone Disorder (CKD-MBD)
Bone formation is limited as damaged kidneys do not activate Vitamin D into Calcitriol.
Bone matrix weakening is amplified as impaired filtering of phosphorus alters the serum balance with Calcium.
Elevated parathyroid hormone secretion attempts to restore mineral balance at the expense of bone density.

# Solid Organ Transplant Associated Osteoporosis

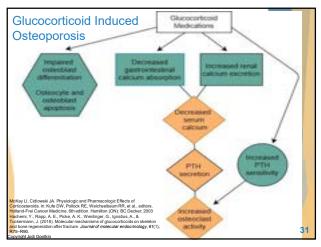
- Underlying metabolic bone disorder and immunosuppressive agents after organ transplantation accelerate the rate of bone loss leading to increased fracture risk.
- Enhanced patient and graft survival necessitates ongoing monitoring of patients following lung, kidney, and heart transplants.

Lan, G. B., Xie, X. B., Peng, L. K., Liu, L., Song, L., & Dai, H. L. (2015). Current

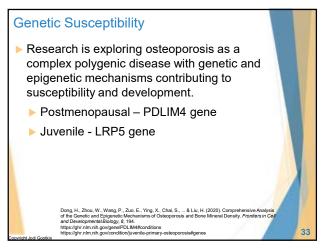
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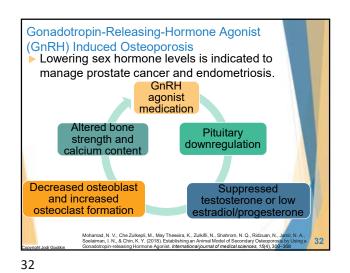
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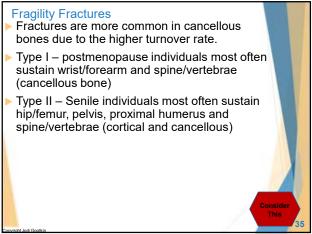


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Consequences of Osteoporosis: Fractures
 Osteoporotic fracture – fractures associated with low bone mineral density.
 Fragility fracture - Fracture from forces that would not ordinarily result in injury or without identifiable trauma.
 Low-energy from standing height or less

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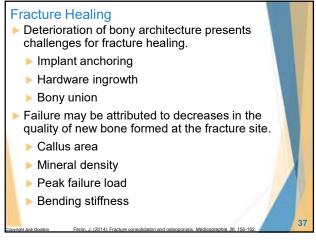




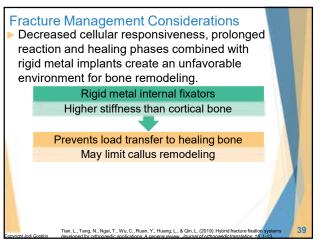
Fracture Related Morbidity and Mortality Physical and Bone Environmental Fall Strength Contributors Disability Post-operative Fracture complications consequences Managing osteoporosis and Fracture related minimizing fracture mortality occurrence is critical to diminishing the mortality risk.

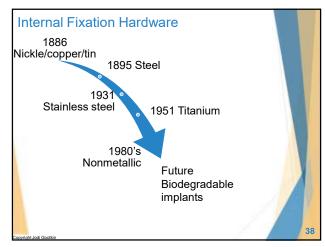
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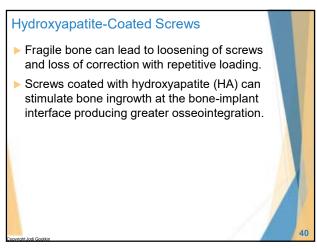




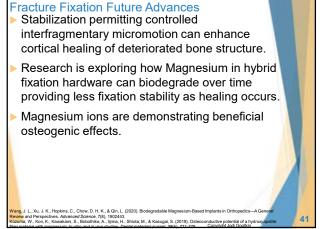


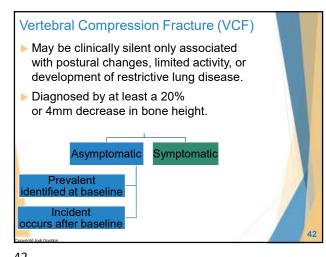


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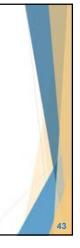


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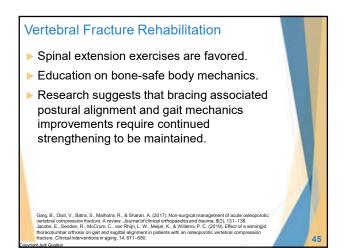


# Iliocostal Friction Syndrome (ICFS)

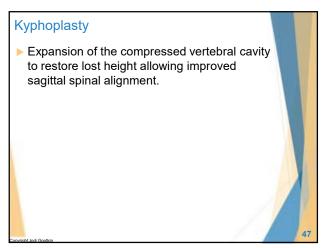
- Vertebral compression fractures narrow the space between the lowest anterior rib and the top of the iliac crest.
- Patient presents with unexplained flank and/or back pain.



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 Orade
 Description

 Grade 0
 normal

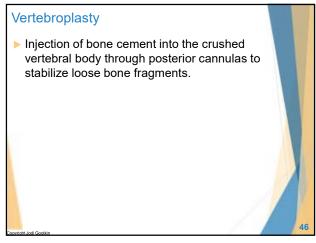
 Grade 1
 mild fracture, <25%</td>

 loss of height
 Grade 2

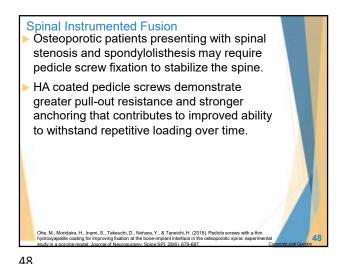
 Grade 3
 >40% loss of height

 Grade 3
 >40% loss of height

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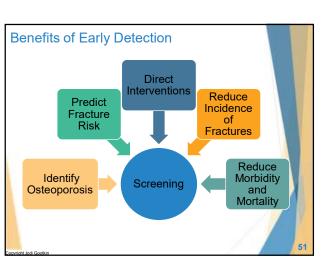


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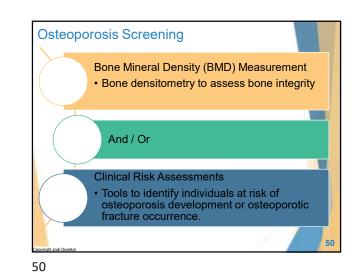
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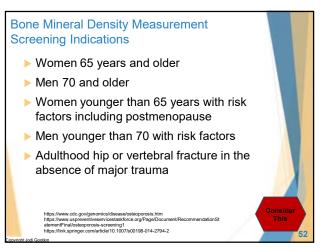
and fall risk sho	injury, presence of ostec ould be considered for nting with hip fractures.	oporosis	
Fracture location	Internal Fixation		
Femoral neck nondisplaced	Cannulated screw		
Femoral neck displaced	Closed reduction and percutaneous pinning Sliding hip screw Hemi/total arthroplasty		
Intertrochanteric Subtrochanteric	Sliding hip screw Intramedullary nail	1	
	.& Hill, B. W. (2014). Osteoporotic Hip and Spine Fractures: A ric orthopaedic surgery & rehabilitation, 5(4), 207–212.	Current	

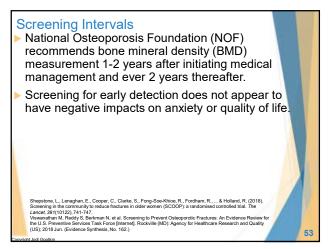


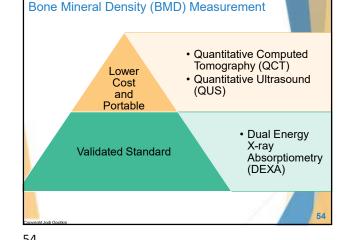


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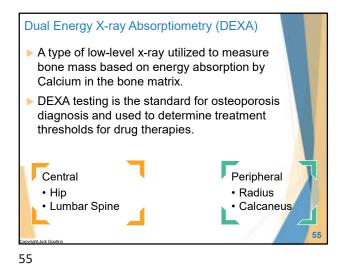


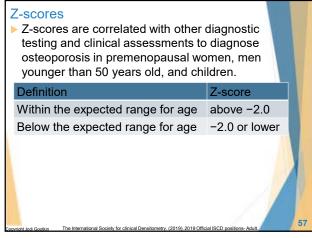


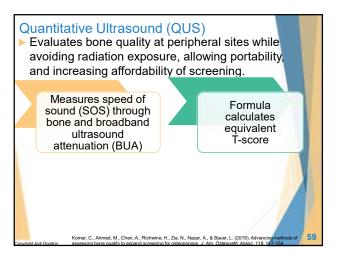


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Osteoporosis: Pathology, Assessment & Management







 Diagnostic Criteria

 Bone Mineral Density (BMD) values from DEXA are utilized for diagnosis and to establish treatment guidelines.

 Bone Mineral Density (BMD)

 • Measured in g/cm<sup>2</sup>

 • Expressed as standard deviation (SD) above or below mean BMD of reference population

 T-score

 • Comparison to young adult reference population of the same sex

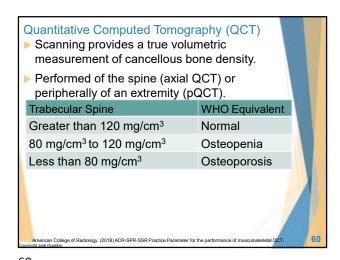
 Z-score

 • Comparison to age, sex, and ethnicity matched reference population

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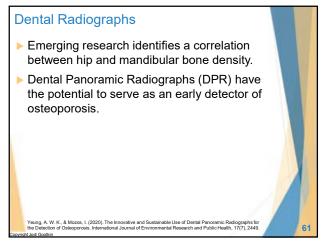
World Health Diagnostic Classification	Organization (WHO)	
	DEXA BMD Measurement Definition	T-Score
Normal	Within 1 SD of mean bone density for young adult women	≥ –1
Low mass (osteopenia)	1–2.5 SD below mean for young-adult women	Between –1 and –2.5
Osteoporosis	≥2.5 SD below normal mean for young-adult women	≤ -2.5
Severe or "established" osteoporosis	≥2.5 SD below normal mean for young-adult women in a patient who has already experienced ≥1 fractures	≤ -2.5

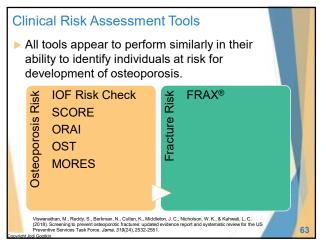
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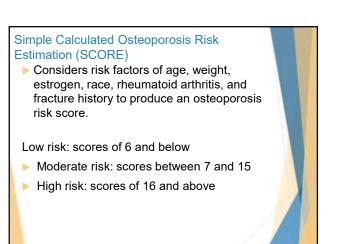
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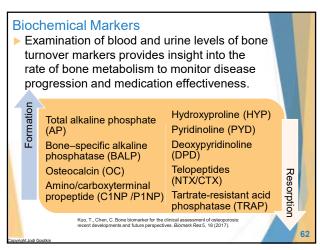
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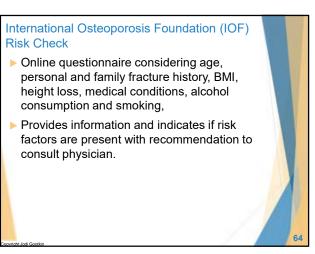


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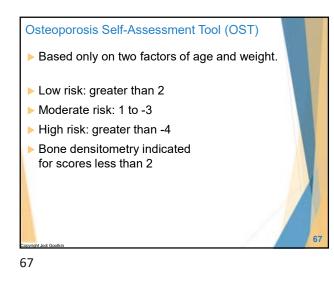


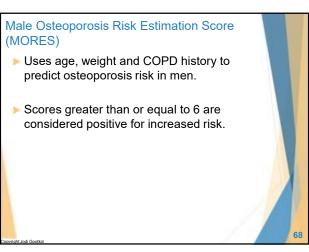
- Calculates scores based on age, weight, and current estrogen use.
- Bone densitometry indicated if total score is greater than or equal to 9.

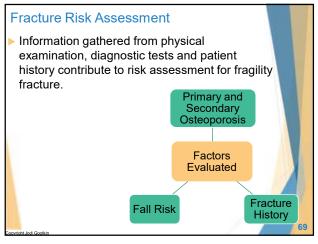
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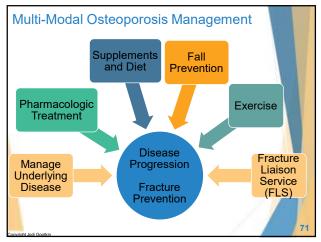
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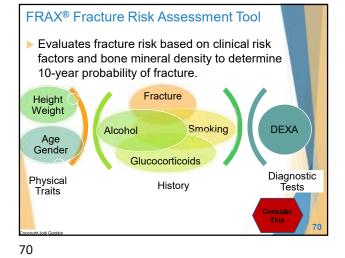




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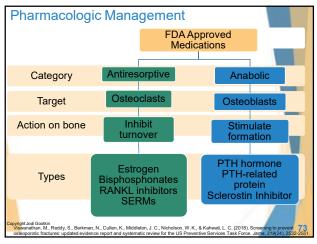
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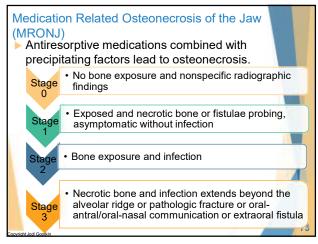
Pharmacologic Treatment Thresholds
Thresholds for intervention with medications are based on BMD testing.
The National Osteoporosis Foundation (NOF) recommends pharmacologic treatment:
Clinical or asymptomatic hip or vertebral fractures
T-scores ≤ -2.5
Postmenopausal women and men age 50 or older with T-score -1.0 to -2.5 AND10 year fracture probability ≥3% or FRAX<sup>®</sup> ≥20 %

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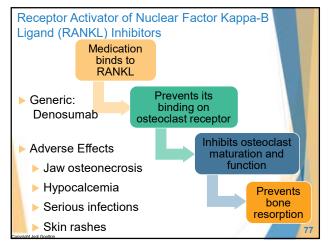
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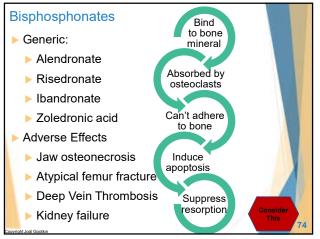


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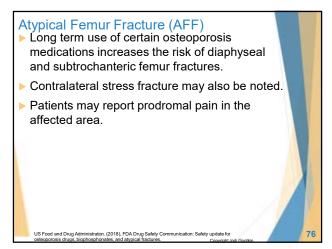


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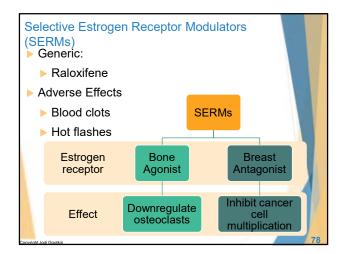
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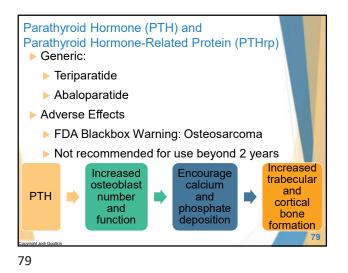


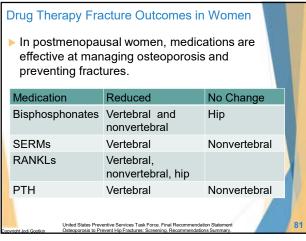


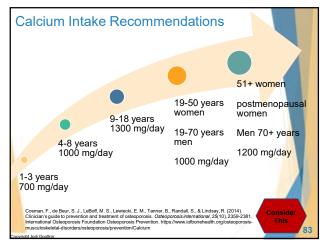


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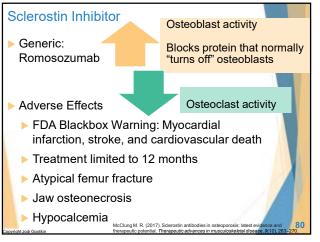




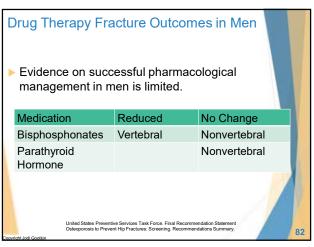


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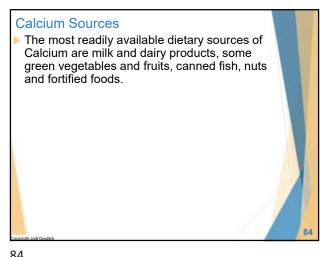
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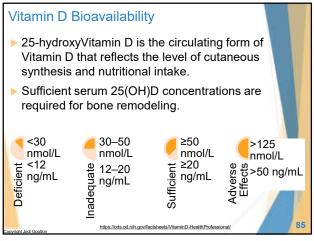


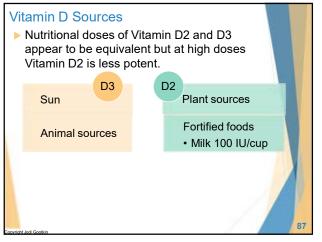
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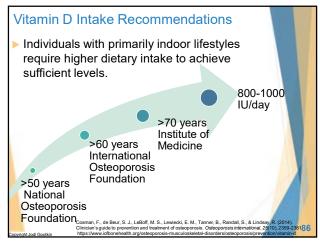
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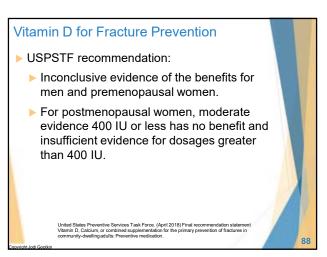




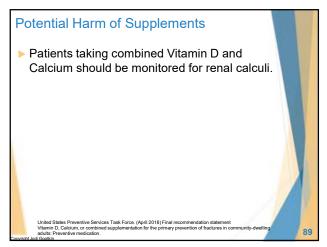
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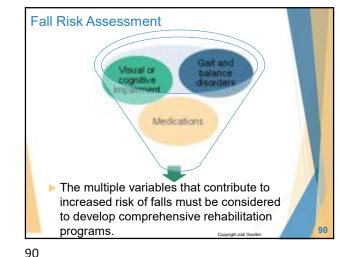


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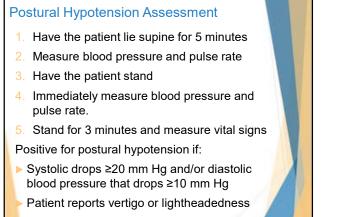
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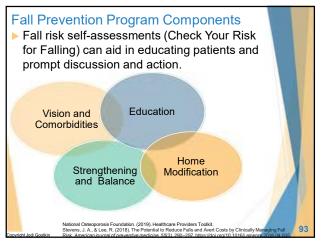


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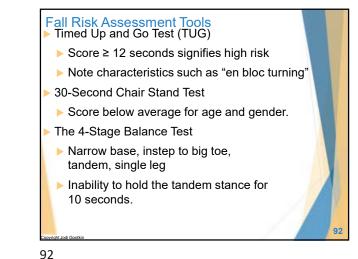
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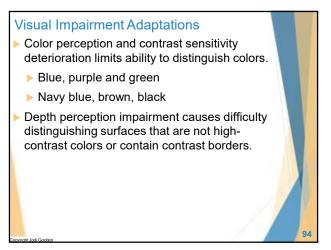


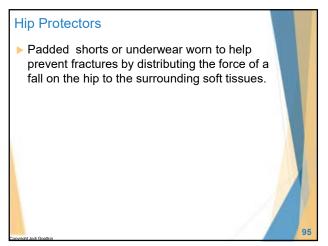


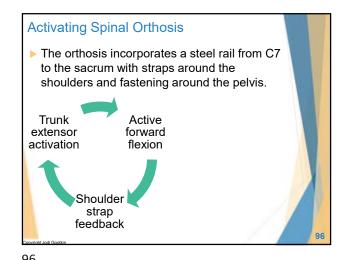


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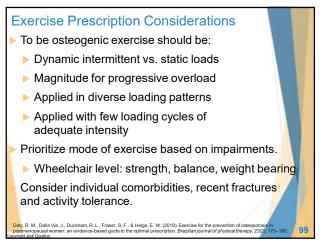
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### **Bone-Safe Body Mechanics**

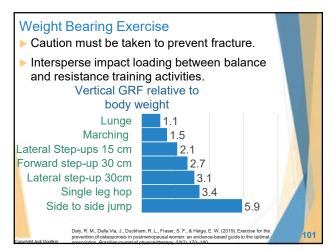
- Avoid slouching, forward bending from trunk, twisting and combined motions with force.
- Ensure proper posture, good base of support and do not pull on rail to negotiate stairs.
- Sleep side lying in bed with pillow between knees.
- Modifications or alternatives to high-impact activities and those that place excessive force or stress across joints.



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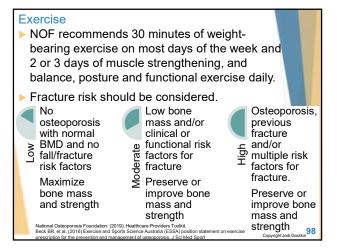
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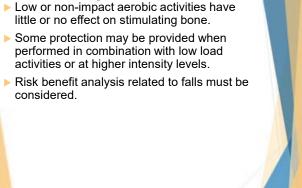
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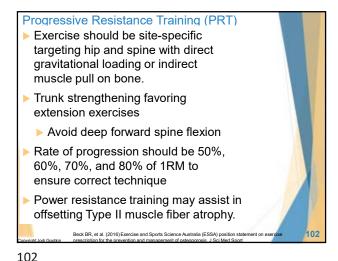
### **Aerobic Training**



for the preve

Daly, R. M., Dalla Via, J., Duckham, R. L., Fraser, S. F., & Helge, E. W. (2019). Exercis osteoporosis in postmenopausal women: an evidence-based guide to the optimal preso



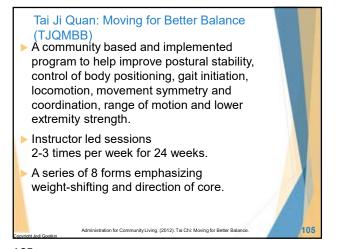


### Balance and Mobility Training

- Balance and mobility training programs do not appear to provide sufficient bone strain to stimulate adaptive skeletal benefit but can enhance neuromuscular condition to diminish fall risk.
- Alter base of support, surface, visual input, speed, concurrent arm motion.
- Including dual task training can improve functional performance in both single and dual task conditions.



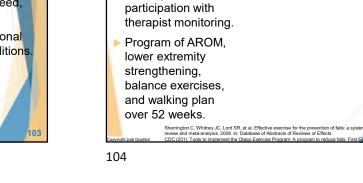
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Exercise Outcomes				
Population	Intervention	Outcome		
Males 65-90 years	Resistance, WBV, Qi Gong, Orthosis	Resistance/Activating Orthosis improved strength and mobility WBV improved mobility Qi Gong no change		
Females over 60 years	Activating orthosis, Resistance/ Balance	Both decreased pain and increased strength. No change spinal curve		
Genest, F. M. N. Lindström, S. Scherer, S. Schneider, M. & Seefried, L. (2020). Efficacy and safety of simple averaties interventions from with ostepororsis-a prospective randomized controlled trial. Ain, C. K. (Lizune, E., Krohted, A. C. G. Alimaphizadah, H. & Salminen, H. (2019). Effect of treatment on back pain and back denotes strength, with a spinal orthosis in older women with osteoporosis: a randomized controlled trial. Archives of osteoporosis, 14(1), 5.				

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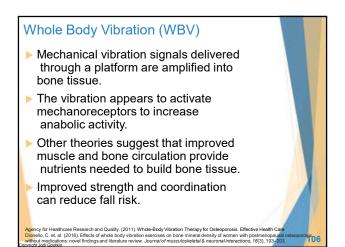
Initial supervised

based patient

therapist instruction

followed by home-

Otago Home Exercise Program



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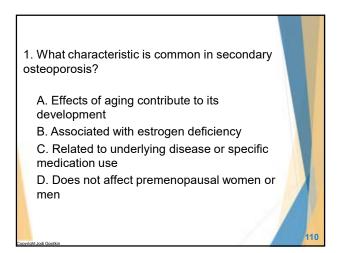


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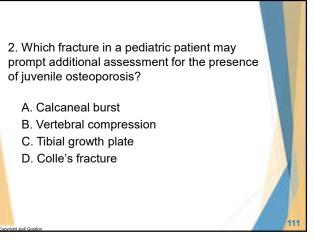
# Conclusion

 Prevention, detection, and treatment of osteoporosis can decrease fracture risk, complications and mortality as well as improve quality of life.

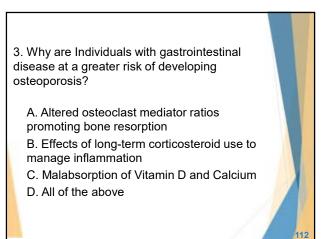
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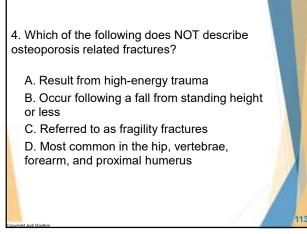
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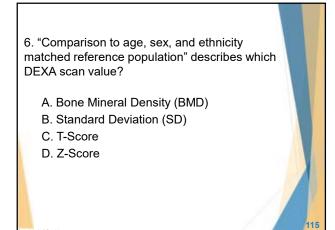


5. According to current recommendations, which individual should be screened for osteoporosis?
A. 63-year-old active female who plays pickle ball 3 days a week
B. 52-year-old female with history of early onset menopause and smoking
C. 68-year-old male who is a community ambulator and works part-time
D 55-year-old obese female with vertebral fracture sustained in a motor vehicle accident

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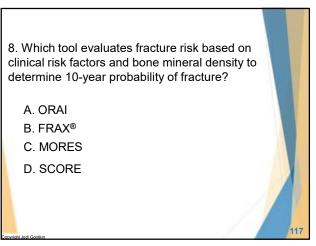
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7. According to the World Health Organization, what T-score value on DEXA would be classified as osteoporosis?
A. ≥ -1

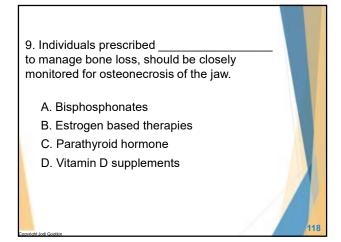
B. between -1 and -2.5C.  $\leq -2.5$ D.  $\leq -2.5$  with fragility fracture

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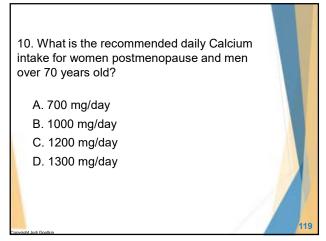


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