

# Who gets Osteoporosis Bone Tested and Why

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Residency

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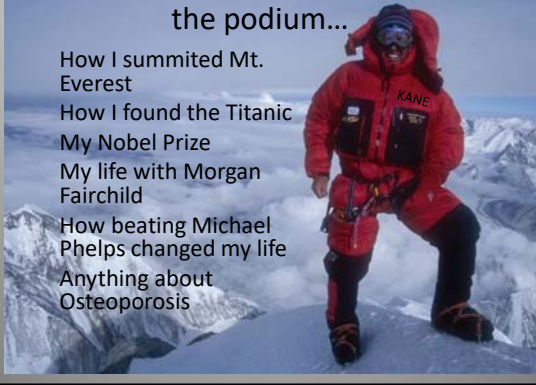
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## Topics for which I should never be at the podium...

- How I summited Mt. Everest
- How I found the Titanic
- My Nobel Prize
- My life with Morgan Fairchild
- How beating Michael Phelps changed my life
- Anything about Osteoporosis



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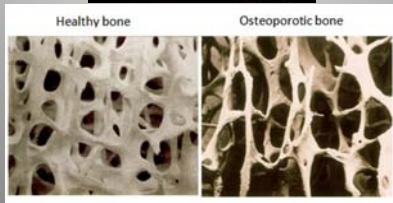
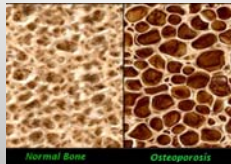
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## Osteoporosis 101



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## Osteoporosis

- Osteoporosis and osteopenia affect an estimated 54 million individuals in the United States. This prevalence has been associated with increased age, along with differences based on sex, race, and ethnicity
- Notably, non-Hispanic whites and women are the largest cohort to be affected

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## Fragility Fractures

- Fractures that occur from a fall from standing height or less.
- The most common locations are vertebrae, hip, and wrist.
- A fragility fracture implies the diagnosis of osteoporosis.
- Unfortunately, most patients with this fracture are not given their diagnosis or offered treatment.

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## Are we liable for not checking?




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### Basic Bone Osteomalacia

- **Vitamin D** deficiency also can be highly prevalent in patients with osteoporosis and may lead to osteomalacia, which can exacerbate the risk of fracture. Osteomalacia, a condition that weakens bone because of poor mineralization, also can result in increased fracture risk, especially when associated with osteoporosis.

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### Vitamin D

- A generally accepted vitamin D level of 30 ng/mL and higher is considered sufficient, whereas 20 ng/mL is considered in the low normal range.

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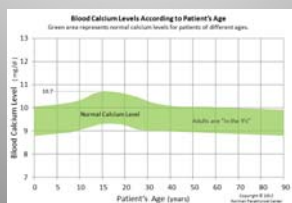
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### Basic Labs

- The baseline laboratory workup may show low serum calcium, vitamin D, and albumin, which then should lead to supplementation and nutritional counseling




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### What is Osteoporosis?

- According to the World Health Organization, osteoporosis is determined by a T-score less than or equal to  $-2.5$  at the femoral neck or lumbar spine. **Board Question**

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### The Tests

- Dual-energy x-ray absorptiometry (DEXA) testing should be initiated in all patients at risk for osteoporosis. A diagnosis of osteoporosis or osteopenia can be made based on T-scores of the spine and hip.



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### T scores

- Although the diagnosis of osteoporosis likely necessitates treatment, individuals with osteopenia having a T-score between  $-1.0$  and  $-2.5$  should be evaluated based on their individual risk factors.

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### The Osteopenia Tweener

- The majority of fragility fractures occur in patients who have a T-score greater than  $-2.5$ .
- In other words, the detection rate for these fractures (sensitivity) is low.
- Should we be using another test?

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### Improving the DEXA

- A newer measurement is the **trabecular bone score**, which is a textural metric that is derived from the spine DEXA image. It reflects trabecular microarchitecture and fracture risk independently of bone mineral density.

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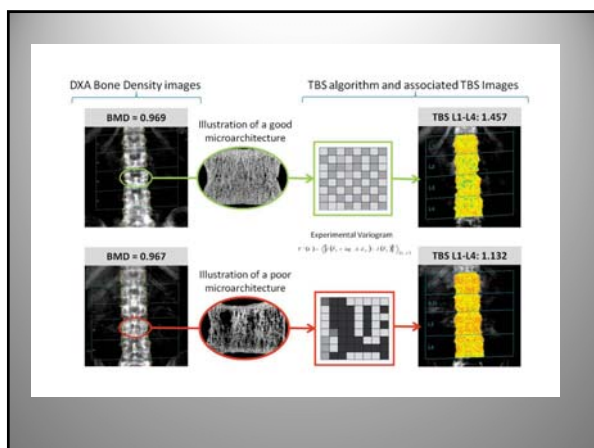
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### Patients with same BMD may not have the same risk of fracture

Different TBS value

Same BMD

TBS L1-L4: 1.457

TBS L1-L4: 1.132

Different patient management ?

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BMD	TBS
normal T-score $\geq -1$	normal TBS $\geq 1.350$
low bone mass $-1 < \text{T-score} < -2.5$	partially degraded $1.200 < \text{TBS} < 1.350$
osteoporosis T-score $\leq -2.5$	degraded TBS $\leq 1.200$

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Patient: M patient  
Date de naissance: 07.07.1954  
Sexe: Homme  
Date de l'examen: 27.09.2016  
Méthode: Protonaire  
Centre: Radiologie et Radiol.

#### RAPPORT TBS AU RACHIS

Graphique de référence TBS  
TBS L1-L4: 1.154

Cartographie TBS

Résultats complémentaires

Age	TBS	Diffé	T-score Diffé
L1	1.012	0.862	-0.1
L2	1.102	0.952	-0.1
L3	1.207	0.957	-0.1
L4	1.158	0.908	-0.2
<b>L1-L4</b>	<b>1.154</b>	<b>0.904</b>	<b>-0.2</b>
L1-L2	1.182	0.928	-0.1
L1-L3	1.180	0.942	-0.1
L2-L4	1.202	0.936	-0.1
L2-L3	1.224	0.992	-0.2
L3-L4	1.228	0.936	-0.2

Commentaires  
Less than 1.2 may be the new threshold for treatment

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### More tests that we might use

- The Fracture Risk Assessment Tool (FRAX), has been developed by the World Health Organization.
- FRAX combines clinical risk factors with or without DEXA measurements to calculate the 10-year probability of a major osteoporotic fracture.

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### Treatment?

- The National Osteoporosis Foundation has recommended that a patient with a 10-year fracture risk at the hip of 3% or greater, or a 10-year risk of a major osteoporotic fracture of the proximal humerus, wrist, or vertebral fracture of 20% or greater should receive pharmacologic treatment.

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### The Recommendations OKU

- All older adults at risk for osteoporosis should be evaluated for osteoporosis and for risk factors for osteoporotic fractures.
- Persons at risk are those over age 65 and those under age 65 with three or more risk factors. One or two risk factors may trigger the evaluation.
- At risk persons should have a history and physical examination, BMD test, and laboratory testing. The medical history should focus on risk factors for low bone density and risks for falls.
- Questions regarding family history of osteoporosis or hip fracture, personal history of fracture, current or previous smoking, excess alcohol use, menopausal status and medication use should be asked.
- A BMI of less than 21 kg/m<sup>2</sup> and a loss of more than 5 cm (or 2 inches) are both risk factors for osteoporosis. Presence of a gait disorder, lower extremity weakness, and postural instability all increase risk for falls and fractures. Additionally, evidence of thoracic kyphosis may suggest vertebral fractures

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### Risk Factors

- Advanced age
- Smoking
- Female gender
- Inadequate calcium intake
- White/Asian race
- Inadequate vitamin D
- Low peak bone mass
- Low body weight (BMI <21 kg/m<sup>2</sup>)
- Family history of osteoporosis
- Estrogen deficiency
- Personal history of fracture
- Hypogonadism
- Chronic glucocorticoid therapy




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### Risk Factors

<u>Endocrine</u>	<u>Chronic drug therapy</u>
Hypogonadism	<b>Glucocorticoids</b>
Hyperthyroidism	Thyroxine
Anorexia nervosa	<b>Anticonvulsants</b>
Hyperparathyroidism	GnRH agonists
	Aromatase inhibitors
<u>Nutritional</u>	<u>Other</u>
Malabsorption syndromes	Hypercalciuria
Vitamin D deficiency/resistance	<b>Alcoholism</b>
Calcium deficiency	

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### Risks for falls

- Gait disorders
- Lower extremity muscle weakness
- Cognitive impairment/dementia
- Neurodegenerative disorders of the central nervous system
- Hypotension
- Impaired vision
- Impaired hearing
- Medications affecting postural stability



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### Thanks



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