



Specialized and comprehensive fracture care for older adults.



Fracture Risk Assessment

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Disclosures

- No conflict of interest disclosures

Other:

- Board Member, International Geriatric Fracture Society
- Board Member, AOA Own the Bone Steering Committee
- Co-Chair, AAOS Hip Fx CPG Committee



Objectives

- Describe screening tools (DXA, TBS, FRAX)
- Explain clinical application of screening tools
- Understand how combined application of screening tools may render greatest benefit



Fracture risk assessment

- Bone mineral density accounts for 60-70% bone strength
- Other determinants of bone strength
 - Bone geometry
 - Cortical thickness
 - Trabecular architecture
- Fall risk
- Individual patient characteristics



Patient Factors Decreasing Bone Strength

Non-modifiable Risk Factors

- Age, Gender, Ethnicity, Family History, BMI, Menopause, History of Fracture, Loss of Height

Bone Factors

- BMD, Bone Turnover, Hip Axis Length, Bone Geometry

Modifiable Risk Factors

- Calcium, Vitamin D Intake, Lifestyle, Smoking Status

Disease States



Increased Fracture Risk

Patient Factors Increasing Fall Risk

Intrinsic Factors

- Physical/Medical Disorders, Nutrient Deficiencies, Metabolic Disorders, Dementia, Incontinence

Extrinsic Factors

- Environmental Hazards, Improper Footwear, Inadequate Walking-aids
- Abuse

Medications & Alcohol Use

- Hypnotics, Psychotropics, Hypotensives, Antiarrhythmics

Inadequate Perception of Environment

- Inadequate Lighting or Glasses, Bifocal Lenses, Glare



Dual-energy x-ray absorptiometry (DXA)

- Accessible, low cost, low radiation exposure
- Standard for osteoporosis screening
- Standard for monitoring response to treatment



Opportunistic CT

- Hounsfield units
- Infer bone quality and fx risk
- Correlation between TBS and DXA



Trabecular Bone Score (TBS)

- DXA software add-on
- Lumbar spine DXA imaging to assess bone microarchitecture
- Possible tool for risk stratification

TABLE II Trabecular Bone Score Interpretation ⁷⁰	
Score	Interpretation
≤1.2	Deterioration of bone microarchitecture
>1.2 to <1.35	Partially degraded bone microarchitecture
≥1.35	Normal bone microarchitecture



Fracture risk assessment tool (FRAX)

- Multiple risk factor calculations
- 10 year risk of major osteoporotic fx and hip fx
- BMD not necessary
- Available in 66 countries



Garvan fracture risk calculator

- Based on Australian Dubbo Osteoporosis Epidemiology Study
- Incorporates fall risk
- Incorporates multiple fracture data
- 5 and 10 year hip and other site fxs



Qfracture

- Developed from UK database
- 26 independent clinical factors
- Falls
- Dose dependent smoking and alcohol intake
- No BMD
- 1 and 10 year hip and other fx risk



Current National Bone Health Alliance Recs

- T-score of ≤ -2.5 at the femoral neck, total hip, or lumbar spine
- T-score of -1.0 to > -2.5 with a history of low-trauma fracture
- History of a low-energy hip or vertebral compression fracture, regardless of T-score
- FRAX score for 10-year major osteoporotic fracture risk of $\geq 20\%$ or 10-year hip fracture risk of $\geq 3\%$.



Thank you!

Questions?

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