Evidence-based strategies for patients with osteoporosis

Kathryn K Brewer PT, DPT, MEd,
Geriatric Clinical Specialist Emeritus


One size
does NOT fit all

Objectives:

1. Discuss key items in medical and therapy assessment for patients with osteoporosis

2. Implement and integrate evidence based, patient-centered strategies related to interventions for strength, balance, posture, safe movement

3. Differentiate guidelines for variations of resistive exercise based on fx risk characteristics

4.Discuss key concepts of comprehensive and lifelong care of patients with low bone density and fracture risk.

5. Access resources to support clinical decision making in bone health for older adults

Fracture prevention (LeBoff, 2021)

PHARMACOLOGIC TREATMENT

ADEQUATE INTAKE OF CA & VIT D

AVOIDANCE OF SMOKING AND EXCESSIVE ALCOHOL INTAKE

WEIGHT-BEARING AND RESISTANCE TRAINING EXERCISE

FALL PREVENTION

Universal Recommendations (LeBoff, 2021)

- Counsel patients on the risks associated with osteoporosis
- Dietary recommendations
- Monitor and maintain serum 25-hydroxy Vit D levels
- Identify and address modifiable risk factors associated with falls (medications, hypotension, gait/balance dysfunction, vision disorders)
- Provide guidance for smoking cessation, avoidance of excessive alcohol intake
- Refer for resistance training exercise and safe movement strategies in ADL/IADLs
- Home/environmental fall hazard evaluation and remediation
- In post-fx patients – coordinate care in multidisciplinary programs and transition management, non-pharmacological pain management whenever appropriate

Diagnostic Assessment Recommendations (LeBoff, 2021)

BMD testing

- Women aged ≥ 65 and men ≥ 70
- Postmenopausal women and men aged 50-69 based on risk profile
- Postmenopausal women and men age >50 with hx of adult-age fx

Vertebral fx imaging (Xray or DXA) when these risk factors present

- Any cause incident of fx
- Historical height loss of >1.5 in
- Recent or ongoing longterm glucocorticoid tx
- Dx of hyperparathyroidism

PT Assessment Items (Avin, 2022) - HISTORY

GENERAL (ALL GERIATRIC PATIENTS)

- Hx of falls, exercise & physical activity

(ADDITIONAL ITEMS) SPECIFIC TO PATIENTS WITH OSTEOPOROSIS

- Current medications associated with fall risk and bone loss
- Bone health related co-morbidities
- Hx of fracture
- Results from prior BMD assessment and imaging studies

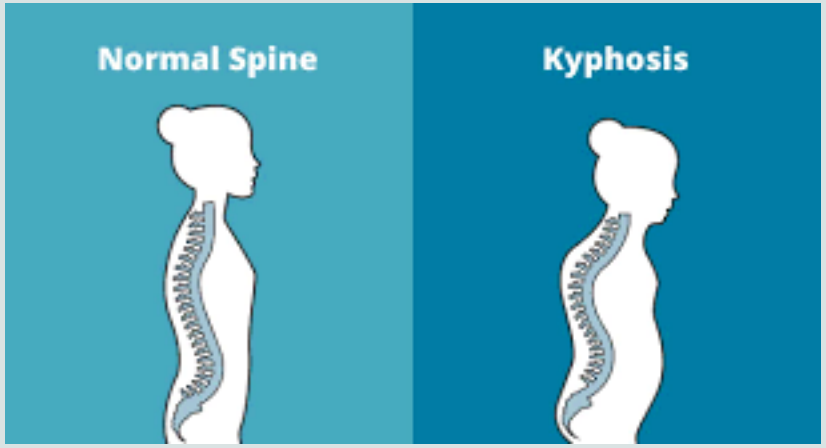
PT Assessment Items (Avin, 2022) – TESTS & MEASURES

GENERAL (ALL GERIATRIC PATIENTS)

- Assessment of static and dynamic balance
- Balance related outcomes
- Observational gait analysis
- Functional LE strength

(ADDITIONAL ITEMS) SPECIFIC TO PATIENTS WITH OSTEOPOROSIS

- Quantification of thoracic kyphosis



https://spineconnection.org/back-pain-conditions/kyphosis/ accessed 10/22/24

PT Assessment Items (Avin, 2022) – EDUCATION

GENERAL (ALL GERIATRIC PATIENTS)

- Fall risk reduction strategies
- Safe pain modulating activities

(ADDITIONAL ITEMS) SPECIFIC TO PATIENTS WITH OSTEOPOROSIS

- Fx prevention strategies including slowing the rate of bone loss
- Exercise to support bone-safe posture
- Resistance, aerobic, balance and flexibility exercise prescription
- Knowledge and application of safe and unsafe postures and movement

PT Assessment Items (Avin, 2022) – INTERVENTION

GENERAL (ALL GERIATRIC PATIENTS)

- Posture, body mechanics and activity modification to reduce fall risk
- Resistance exercise
- Balance training

(ADDITIONAL ITEMS) SPECIFIC TO PATIENTS WITH OSTEOPOROSIS

- Posture, body mechanics and activity modification to reduce fracture risk during daily activities including exercise
- Bone-healthy body mechanics patterns of exercise (fracture preventive and bone mineral density preserving)

Mechanism of Exercise on Bone Formation and Remodeling

Exercise and physical activity can prevent bone loss in older adults. The mechanism of increased bone formation (osteogenesis) is influenced by the formation of new blood vessels (angiogenesis). (Tong, 2019)

Mechanical loading from exercise influences bone formation by:

Release of hormones (estrogen, parathyroid hormone, and glucocorticoids)

Reduction of proinflammatory cytokines (responsible for bone resorption; i.e. IL-6, TNF-ά)

Increase the protective cytokines against bone resorption. (Tong, 2019)

The ideal osteogenic exercise program would include:

Variety of high load and high impact activities, applied with progressive overload.

High magnitude strains applied at a rapid rate and of a varied nature.

Short bouts interspersed with recovery; preferable to long duration loading.

Mechanical loading that are considerably greater than habitually experienced.

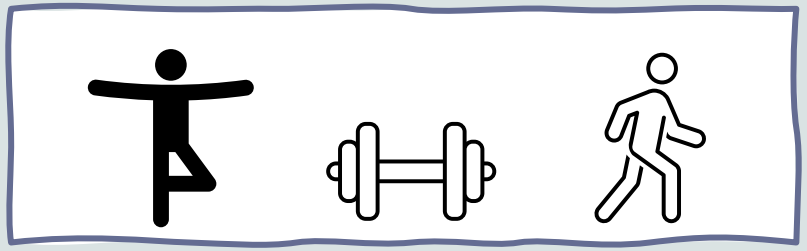
Physical Therapist Management of Patients With Suspected or Confirmed Osteoporosis: A Clinical Practice Guideline From the Academy of Geriatric Physical Therapy

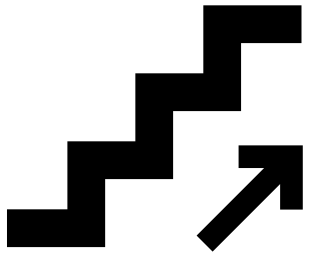
Gregory W. Hartley, PT, DPT, FAPTA[1]; Kathryn E. Roach, PT, PhD[1]; Robert W. Nithman, PT, DPT, PhD[2]; Sherri R. Betz, PT, DPT[3]; Carleen Lindsey, PT, MScAH[4]; Robyn K. Fuchs, PhD, FACSM[5]; Keith G. Avin, PT, DPT, PhD[5]

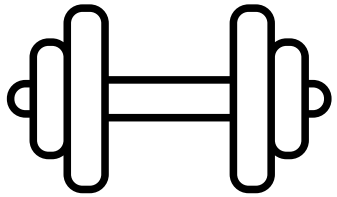
J Geriatr Phys Ther 2022;45(2):E106-E119

Specific ex intensity/mode to slow the decline of bone mineral density

- **POST**-menopausal Women (Hip and Femoral Neck) - Long duration exercise programs consisting of
  - ✓ *static weight-bearing exercise*
  - ✓ *adequately dosed progressive resistive strength training alone or in combination with impact exercise training (i.e. jogging, walking, aerobics)*
- **POST**-menopausal Women (Lumbar spine) - Long duration exercise programs consisting of
  - ✓ *Walking, tai chi*
  - ✓ *Progressive resistance strength training*







Specific ex intensity/mode to slow the decline of bone mineral density

- **PRE**-menopausal Women (Hip and Femoral Neck) - Long duration exercise programs consisting of
  - ✓ *High impact exercise (i.e. jogging)*
  - ✓ *Combine impact exercise (i.e. stair climbing) with progressive resistive strength training*
- **PRE**-menopausal Women (Lumbar spine) - Long duration exercise programs consisting of
  - ✓ *Progressive resistance strength training alone or in combination with impact exercise (i.e. stair climbing or jogging)*

Fall risk

- Exercise influences fracture risk when the exercise is multimodal and part of a fall prevention program
- Exercise interventions may decrease the risk of fracture by both increasing BMD and by decreasing risk of falling.
- Fall risk assessment is essential in individuals with osteoporosis
- Consult the Academy of Geriatric Physical Therapy/APTA clinical guidance statement directed at fall risk reduction. (Avin KG, Hanke TA, Kirk-Sanchez N, et al. Management of falls in community-dwelling older adults: clinical guidance statement from the Academy of Geriatric Physical Therapy of the American Physical Therapy Association. Phys Ther. 2015;95(6):815-834. doi:10.2522/ptj.20140415)

Adherence to long duration exercise and behavior change

- Health literacy
- Readiness for change
- Access to health care and physical therapy services
- Economic stability: economic distress may be insecure food or housing, social isolation.
- Safe neighborhoods and built environment

APTA Geriatrics | Bone Health SIG

TOOLKIT

Bone Health Special Interest Group

ACADEMY OF GERIATRIC PHYSICAL THERAPY

Exercise Interventions… (pp27-39)

- Prevention of osteoporosis
- Pre-menopausal with and without bone loss
- Post-menopausal with bone loss but NO recent fx
- Individuals WITH fragility fx
- Men with low bone mass
- Manual therapy and exercise for thoracic hyperkyphosis

Additional Considerations post fragility fracture

Vertebral fracture (Giangregorio 2022):

- PT-directed attention is recommended to address pain management
- Use unloaded (supine positions to 2-4 times/day (15-20 minutes) to reduce pain but avoid prolonged bed rest
- Restrict heavy lifting/exertion or activities that exacerbate pain 12-weeks post fracture
- Address body mechanics and fall prevention
- Bracing should not be used routinely but may be beneficial if it reduces fear or improves confidence in early stages post-fracture to support mobility

Hip fracture care (McDonough 2021):

- Early mobility and ambulation after hip surgery are strongly recommended (unless other medical contraindications)
- Address strength, balance and functional deficits 8-16 weeks after fracture (OP care + EB community-programs)

https://www.bonehealthandosteoporosis.org/preventing-fractures/general-facts/ Accessed 10/22/24

TASK FORCE REPORT

JBMR

Secondary Fracture Prevention: Consensus Clinical Recommendations from a Multistakeholder Coalition

- Recommendations for target population of high risk patients (≥ 65 with hip or vertebral fx)
- "The overarching principle is that this target population should be managed in the context of a multidisciplinary clinical system that includes case mgt to assure that they are appropriately evaluated and treated for osteoporosis and risk of future fractures"
- 13 consensus recommendations: **consistent messaging re: chronic medical condition and risk of future fx**; pharmacologic therapy benefit:risk; nutritional counseling; fall risk interventions with PT/OT referral re: mobility, gait, balance dysfunction; lifestyle behaviors; safe PA and exercise preferably supervised by physical therapists, referral to address contributing co-morbitities/2^0 causes; re-evaluation/monitoring for effectiveness of tx plan

(Conley, 2020)

Key References

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- Tong X, Chen X, Zhang S, et al. The Effect of Exercise on the Prevention of Osteoporosis and Bone Angiogenesis. Biomed Res Int 2019;2019:8171897 doi: 10.1155/2019/8171897
- https://aptageriatrics.org/sig/bone-health-toolkit/ (accessed October 19, 2024)

Additional Resources

- **Medical Screening and Diagnosis**
  - BHOF Healthcare Provider Diagnosis & Treatment Factsheet resource: https://www.bonehealthandosteoporosis.org/wp-content/uploads/BHOF-HBHC_Houston-FINAL.pdf
  - NCQA-Improving Osteoporosis Care, Case-based application: NCQA-Improving-Osteoporosis-Care-Whitepaper-2022.pdf
  - FRAX Fracture Risk Assessment Tool. Centre for Metabolic Diseases Website. https://frax.shef.ac.uk/FRAX/tool.aspx?country=9 Accessed 10/23/24.
  - 10-Year Fracture Risk Calculator. Bone Health & Osteoporosis Foundation. https://americanbonehealth.org/calculator/ Accessed 10/23/24.

Pharmacology

- BHOF -Osteoporosis Medicines: https://www.bonehealthandosteoporosis.org/wp-content/uploads/Bone-Basics_Osteoporosis-Medicines_update.pdf Accessed 10/23/24.
- BHOF/IOF- https://www.bonesource.org/radically-simple-tool Accessed 10/23/24.

- **Nutrition**
  - BHOF; https://www.bonehealthandosteoporosis.org/healthy-bones-guide-calcium-intake/ Accessed 10/23/24.
- **Exercise**
  - https://geriatrictoolkit.missouri.edu/osteoporosis/ABH_Do_It_Right_and_Prevent_Fractures_booklet.pdf Accessed 10/23/24.
  - https://osteoporosis.ca/wp-content/uploads/OC-Too-Fit-To-Fracture-Osteo-Exercise-Book.pdf Accessed 10/23/24.

Thank you

Kathy Brewer

ptkkb55@gmail.com

https://aptageriatrics.org/sig/bone-health-special-interest-group/