

# Spotlight on Health

## Bone Health

Over 53 million Americans have low bone density.<sup>1</sup> Each year, 2 million bone fractures related to low bone density occur in the United States, costing over \$19 billion to treat.<sup>2</sup> As the baby-boomer generation ages, the number of bone fractures and cost of care are expected to increase.

Because patients with low bone mineral density (BMD) can be asymptomatic until they experience a bone fracture, the condition is underdiagnosed. Healthcare providers can play a vital role in early detection and prevention of fractures. You can proactively identify and screen at-risk populations.

This newsletter will discuss the risk factors, assessment, and monitoring of bone health as suggested by established guidelines. It will also describe what your patients can do to help build and maintain their bone health.

### Risk Factors

Age is a leading risk factor for low bone density. Rates of bone resorption and formation affect BMD and occur at different rates throughout life. BMD peaks around age 25 and starts to decline rapidly around age 50. In women, the most rapid loss of BMD occurs 5 to 7 years after menopause. According to the National Osteoporosis Foundation, all men and postmenopausal women over the age of 50 should be evaluated for their risk of low BMD.<sup>3</sup>

Other factors that should be considered when assessing a person's risk for low BMD include:<sup>3</sup>

- Use of certain medications, such as glucocorticoids and proton pump inhibitors
- Diagnosis of another medical condition, such as Paget disease or rheumatoid arthritis
- Intake of excessive alcohol and caffeine
- History of vitamin D and calcium deficiency
- History of smoking

### Measuring Bone Mineral Density

BMD is measured using a dual-energy x-ray absorptiometry (DXA) scan. The results of a DXA scan are expressed as a T-score. A T-score is bone density compared with the normal range in healthy adults of a given sex. It is measured in standard deviations above or below the average. A T-score of -1.0 to -2.4 indicates that the person is starting to lose bone density and has osteopenia. A T-score of  $\leq -2.5$  indicates that the person has osteoporosis.<sup>1</sup>

A lower T-score indicates a higher risk of fracture. However, over 50% of "fragility" fractures occur in people whose T-scores are in the osteopenia range.<sup>1</sup> Regardless of fracture risk, patients can take actions to increase and maintain bone density.



### Ways to Build and Maintain Bone Health

Recommendations for building and maintaining bone health from professional organizations include the following:<sup>6,7</sup>

- Weight-bearing and resistance exercises
- Pharmacologic or hormone replacement therapy as appropriate<sup>1,3,7,8</sup>
- Avoidance of excessive salt, caffeine, and alcohol intake
- Smoking cessation
- Adequate vitamin D and calcium intake

## Vitamin D and Calcium for Bone Health

Vitamin D and calcium work together for bone health. Calcium builds and maintains bone, while vitamin D helps the body absorb calcium. Adequate intake of vitamin D and calcium is a safe and inexpensive way to help reduce fracture risk.<sup>3</sup> Other effective ways to promote bone health are featured in the sidebar on page 1. Below are guideline-based recommendations related to vitamin D and calcium:

- Vitamin D
  - Maintaining serum hydroxy vitamin D (25OHD) levels  $\geq 30$ -50 ng/mL<sup>1,4</sup>
  - Intake of 800 to 2,000 IU per day<sup>1,3</sup>
  - Moderate exposure to sunlight
  - Consuming foods that are high in vitamin D, such as salmon, milk, and mushrooms
  - Use of dietary supplements if needed
- Calcium
  - Intake of 1,000 to 1,200 mg per day<sup>1,3</sup>
  - Consuming foods that are high in calcium
    - Vegetables such as collard greens, broccoli, and kale
    - Fish such as sardines, salmon, and shrimp
    - Dairy items such as yogurt, milk, and cheese
  - Use of dietary supplements if needed

## How the Laboratory Can Help

Laboratory testing can complement DXA scans and clinical assessment. Test results can provide insights on the underlying cause of bone density loss and guide individualized treatment.<sup>5</sup>

Common analytes for bone health include serum hydroxy vitamin D (25OHD), calcium, creatinine, and testosterone (for low levels in men).

Tests such as thyroid stimulating hormone (TSH) +/- free T<sub>4</sub>, and parathyroid hormone (PTH) can help diagnose overactive endocrine function.<sup>3</sup>

Bone turnover markers can assess response to therapy. Resorption markers include serum C-telopeptide (CTX) and urinary N-telopeptide (NTX). Formation markers include serum bone-specific alkaline phosphatase (BSAP), osteocalcin (OC), and aminoterminal propeptide of type I procollagen (PINP).<sup>3</sup> Repeated testing of biochemical markers can help in monitoring treatment and disease progression.<sup>3</sup>

Quest Diagnostics offers an extensive menu of tests to monitor markers related to bone health, including 25OHD, bone-specific alkaline phosphatase, and calcium. Quest also offers additional relevant endocrine tests, including various collagen, cortisol, and osterone tests.

## References

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