What are the biggest risk factors for developing osteoporosis?

The biggest risk factors for developing osteoporosis are outlined in the key areas used by the FRAX assessment system. In this method, developed with the World Health Organization under Dr John A. Kanis, major factors include low body mass index, female sex, older age, family history of hip fracture, patient history of fragility (low-energy) fracture, use of steroids, autoimmune disease (most notably rheumatoid arthritis), secondary causes of osteoporosis, smoking history, ≥3 alcoholic drinks a day, and low bone mass in the hip region. Among these, the most critical factors are old age, bone mass, and history of prior fragility fracture.

What biomechanical tests should be used to help assess patients for osteoporosis?

There are no currently used biomechanical tests to help assess patients for osteoporosis. However, bone density correlates well with fracture risk and is a major risk factor, as previously discussed. In addition, measurements of balance and strength have shown validity in research settings. Fall prevention and strengthening exercises are critical to the prevention of osteoporotic fractures.

What role does the research of bone biology play in defining predictors of fracture risk in patients with osteoporosis?

Ongoing research is critical for understanding the physiology of bone health and how it is altered in osteoporosis. Research is critical to establishing better methods to assess fracture risk in patients. Research is the means of developing new and more effective drug and biologic interventions to both prevent and treat established osteoporosis.

What is the best approach to treating patients with osteoporosis?

The critical elements in treating patients with osteoporosis include individual characterization of the patient bone status; optimi...
zation of supplemental nutrition, vitamin D, and calcium; appropriate use of the many anti-osteoporotic drug options; and a program of physical interventions to prevent falls and gain muscle strength.

Which patients should receive pharmacological treatment?
Patients chosen for drug intervention beyond calcium and vitamin D are individuals with measurable risk for fragility fractures. Depending on various recommendations, most physicians would treat individuals with a T-score of $-2.0$ or $-1.5$ with enhanced risk factors. In addition, most would agree to treat individuals who have sustained a hip fracture or large-bone fragility fracture. The FRAX method would recommend treatment of all patients with a calculated 10-year risk of hip fracture $>3\%$ or any long-bone/vertebral fracture $>20\%$.

What steps can be taken to prevent bone loss?
Steps recommended to prevent bone loss include reasonable nutrition, vitamin D, calcium, and impact exercises. In those patients with initial bone mass demonstrating either osteopenia or osteoporosis, consideration should be given to pharmacological drug therapy under the aforementioned guidelines.

Long-term bisphosphonate use has been linked to atypical hip fractures. Do the benefits outweigh the risks?
Long-term bisphosphonates have been associated with atypical subtrochanteric and diaphyseal femoral fractures. According to the American Society for Bone and Mineral Research task force, there is no clear causative proof. Through multiple studies, it appears that 20 to 100 hip fractures would be prevented for each of these atypical femur fractures. Thus, for society the bisphosphonates are extremely beneficial and should be our first-line treatment agent for most patients with osteoporosis.

Should “drug holidays” be recommended to prevent hip fractures associated with bisphosphonate use?
The atypical fractures appear in patients usually after $\geq 5$ years of bisphosphonate treatment. The Food and Drug Admin-

istration and others in the bone health world now recommend reevaluating the drug program after 5 years. In those individuals with stable bone mass and low levels of bone turnover, a bone holiday may be desirable. When the markers rise or there is clear evidence of bone loss, a new regimen of drug therapy should be considered, either using a non-bisphosphonate or modifying the dose to a lower level if indicated.

What is the direction of future research on osteoporosis?
Osteoporosis research is being directed to developing agents that do not reside for extended periods within the bone. New anabolic agents that stimulate bone formation are under investigation. Individual patient care is important. New strategies are being developed to customize treatment for the individual patient.