Osteoporosis is a major health concern today. It is estimated that some 44 million Americans, mostly women, have or are at risk for osteoporosis.

Research indicates that a woman aged 50 has a 40% lifetime fracture risk of any fragility fracture, and a 19% likelihood of developing a hip fracture. Women who suffer from vertebral fractures may have significant back pain, disability, and deformity. Approximately 20% of women who suffer a hip fracture will die in the following year from the indirect consequences of the fracture.

Not only is this disease devastating to the patients who suffer from it, but the financial costs are staggering. Over the past decade the direct expenditures for osteoporotic fractures have increased from an estimated 5 billion to 14 billion dollars.

Unfortunately despite the importance and widespread nature of this disease, physicians are still having difficulty diagnosing and treating these patients.

Studies have shown that prevention of fracture is critical in the treatment of the disease. Researchers suggest that doctors should consider lowering their threshold for prescribing osteoporosis drugs, especially for women who have risk factors for the development of fracture. Although there may be merit in prescribing bone-building medications to those with osteopenia, prior to the diagnosis of absolute osteoporosis, the cost of the medications and the issues related to insurance coverage for these medications may prohibit their utilization. The ongoing debate about timing of therapy will need to be addressed with further research.

AOA recognizes women’s health issues

In recognition of the long-term significance of women’s health issues and the fact that women drive the consumerism of healthcare, the AOA established the Women’s Health Advisory Committee (WHAC) as part of the division of Public Health.

The mission of this committee has been to provide leadership for the profession in educating practicing physicians, future physicians and the general public concerning gender based issues in women’s health; and to promote legislative, regulatory, and research efforts targeting women’s health.

The 2004-2005 committee members are:

Brooke E. Alexander, DO; Bonnie Bowles; Alison A. Clarey, DO; Mark E. Eastman, DO; Jennifer L. Fredericks; Carol L. Henwood; Joseph Kaczmarczyk, DO, MPH; Carol L. Henwood, DO; Kedrin E. Van Steenwyck, DO; Sherrie Wise; Sharon L. McGill, MPH, committee secretary; and Teresa A. Hubka, DO, committee chair. Dr. Hubka is a fellow and a member of the board of trustees with the American College of Osteopathic Obstetricians and Gynecologists (ACOOG) and a fellow of the American College of Obstetricians and Gynecologists.

New Territories

Osteoporosis: Exploring New Directions

By Teresa A. Hubka, DO
Osteoporosis: Identifying Misconceptions, Reinforcing Truths

By Jan I. Maby, DO

Osteoporosis results in major disability and mortality to our older women patients. It is the silent nature of this disease that allows it to go undetected, lurking in the shadows, for years before the patient presents with a symptomatic fracture. Frequently, the patient’s incident fracture is silent as well. It is this indolent nature of the disease that helps it to stay below the radar screen as we examine our patients in our daily practices. Following are some statements often made about osteoporosis.

I’m too busy to address osteoporosis; besides my female patients are more concerned about breast cancer.

True or False

Breast cancer is a devastating illness and our patients should be counseled, screened and treated according to current guidelines. However, time must be devoted to osteoporosis awareness, risk reduction and treatment to help prevent the epidemic of fractures predicted to occur with the graying of America.

Only geriatricians need to be concerned about osteoporosis counseling.

True or False

Even though most osteoporotic fractures occur in elderly patients, we may be able to reduce the risk by implementing healthy lifestyle choices early in life. Osteoporosis prevention (and that of many other chronic diseases) should begin in childhood to ensure tomorrow’s adults have incorporated healthy lifestyles into their daily routine. As it relates to osteoporosis this includes adequate calcium and vitamin D intake and exercise to achieve adequate peak bone mass.

While most prevalent in white women, osteoporosis can affect both male and female patients of every ethnic group.

True or False

We are seeing a rise in osteoporosis and osteoporotic fractures in males as their life expectancy increases. The incidence of hip fracture is lower in men. However, the mortality associated with hip fracture is twice as high in men as in women. Similar to women, many men who survive hip fracture do not regain their pre-hip fracture level of function and up to 50% will be institutionalized.

My patient already sustained a fracture; it’s too late to begin therapy.

True or False

This common misperception puts patients at risk for further fracture and debilitation. It has been shown that once a patient sustains an initial fracture there is a five-fold increase risk of a second fracture within one year. It has also been shown that this risk, of subsequent fracture, can be reduced with antiresorptive therapy.

Take two multivitamins and call me in the morning.

True or False

In response to our patients’ preference to treat with non-pharmacological therapies, we must understand the role of vitamins in bone health. Vitamin D is required for efficient absorption of dietary calcium and for normal mineralization of bone. Current recommendations from the NIH recommend 400IU of vitamin D in adults aged 51-70 and 600IU for those older than 70.

A comprehensive treatment plan for osteoporosis includes a falls prevention program.

True or False

While not all falls result in fracture the majority of hip fractures are the result of falls. Fracture risk has been consistently associated with a history of falls, low physical function such as slow gait speed and decreased quadriceps strength, impaired cognition, impaired vision, and the presence of environmental hazards.

Jan I. Maby, DO, is currently the chief of Geriatrics and director of the Medical House Call Program at North General Hospital, a physician based home-visit practice serving the frail elderly of Harlem. Previously she served as the director of the Osteoporosis Program and Bone Density Lab at Mount Sinai Medical Center and then accepted a position as the medical director of Cobble Hill Health Center, a 520-bed facility in Brooklyn.
The considerations of the etiology of osteoporosis include inherited predisposition, age, hormone deficiency, hormone excess, immobilization and microgravity, tobacco use, alcoholism, malignancy (especially multiple myeloma), medications, genetic disorders, anorexia nervosa, liver disease, rheumatoid arthritis, and other causes.

Identification of patients at high risk for osteoporosis is the critical first step for the osteopathic physician. A multitude of factors must be borne in mind when assessing patient risk.

Among these are ethnic origin and genetics, age, gender, level of activity, diet, exercise status, weight, medications, vitamin supplementation, cigarette smoking, alcohol consumption, co-morbidities and appropriateness for OMT.

The osteopathic prescription is weighed, discussed with the patient, and considered in the context of the particular patient in much the same way as a medication is considered. Depending on the severity of disease, the use of skillfully applied, non-traumatic and effective osteopathic manipulative treatments together with an osteopathic philosophy of clinical management can assist the patient to achieve maximal health.

An osteopathic approach to the prevention, early detection, and successful treatment of osteoporosis will require a comprehensive plan consisting of identifying the etiology of the disease process with the following essentials:

- Identification of patients at high risk
- Bone mineral density screening
- Patient education
- Disease prevention
- Treatment of somatic dysfunction with OMT
- Nutritional counseling
- Avoidance of toxic substances
- Vitamin/mineral supplementation
- Appropriate medical management
- Exercise programs
- Integration of mind/body/spirit

Osteoporosis is one of the most significant medical issues facing Americans today, affecting an estimated 15 million with primary disease and resulting in tremendous morbidity, mortality, and quality-of-life alterations.

An estimated one billion dollars are spent each year on direct and indirect consequences of this debilitating and preventable metabolic syndrome. Although much has been written about the disease and treatment options, we believe that there are many potential benefits of an osteopathic approach to the management of this disorder. As an osteopathic physician, it is vital that you assess the individual patient’s needs, risk factors, co-morbidities, and appropriateness for OMT.

At the heart of osteopathic principles and philosophy is the concept that structure and function are reciprocally interrelated. With this important tenet in mind, a truly osteopathic approach to osteoporosis must begin with prevention.

Proper structure can only be maintained by preservation of normal function. It is well established that weight-bearing exercise is the cornerstone of osteoporosis prevention. As our population ages, it is essential that we employ our osteopathic principles and techniques to maximize our patients’ ability to perform weight-bearing exercise. The thoughtful use of OMT in the treatment of somatic dysfunction removes impediments to normal activity, including the weight-bearing exercise that
clearly serves to minimize the risk of osteoporosis. We must ensure that our high-risk patients are able to engage in walking, jogging, stair climbing and other aerobic weight-bearing regimens if we are to help our patients to help themselves in this ongoing battle.

Examples of appropriate OMT paradigms for the maximization of function include muscle energy, myofascial release, strain-counterstrain, Still technique, craniosacral manipulation, and several other direct and indirect manipulative approaches. These treatments seek to normalize joint motion, balance soft tissue tension, support the body’s inherent motion, improve circulatory and lymphatic function, and maximize the patient’s feeling of well-being.

Improved bone physiology should result, thus slowing the rate of osteoporosis and improving active daily living through better range of motion, increased confidence in physical activity, and reduced background dull pain. Improved function will then permit high-risk patients to take control of their own health and to invest in regular weight-bearing exercise programs, which—in combination with proper nutrition, lifestyle modifications, and attention to health and wellness—will permit maximization of bone health.

The osteopathic physician, as part of women’s health awareness, must educate female patients regarding the importance of proper diet, menstrual health, and appropriate exercise in the maintenance of bone health. The “Big Gulp,” “Extra Size” generation is a problem that every practitioner must address with his or her adolescent patients. Carbonated beverages, a low-quality protein intake, and low-mineral diets affect the metabolic health of our adolescents and young adults. Combined with a sedentary lifestyle, this sets up the patient for early osteoporosis regardless of the etiology.

The basic osteopathic manipulative medical techniques indicated for osteoporosis are divided into two groups. One group is for patients without fracture or advanced disease; the other group is for patients with advanced disease, active and past fractures, and with acute pain. Both groups require today’s medical management of the disease as part of the regime. The decision-making in selecting the technique, the duration or dose of the technique, the monitoring of the results, and the risk benefit of the OMT is the same clinical decision-making.

Muscle energy manipulative treatment can be carefully used with reciprocal inhibition techniques and isometric manipulative forces. One should keep in mind that the counterforces of the patient should be very light, and the rules of no pain, three-to-five-second counterforces and slow positioning should be employed.

Pain activates nociceptive mechanoreceptors that will defeat the relief of pain, reflex-sustained contracture, and the restoration of homeostasis of the facilitated segment. Pain during any of the OMT is a reason to stop the procedure, but especially during the combined technique of muscle energy.

Indirect myofascial release requires about 20 seconds in order to “release” an area of somatic dysfunction. The motion is away from the pathological barrier, and is slow and gentle. Constant monitoring of the tissues during the treatment is required. It can be used for the first group of patients and cautiously with the second.

Strain-counterstrain osteopathic manipulative treatment if done as directed is the safest of the articulatory types of OMT discussed here. Slowly positioning the body into a position of ease or total comfort and holding the patient there for 90 seconds or more will relieve congestion and inflammation and reduce nociceptive pain. The relief and subsequent improvement in mobility and activity will safely help many of both groups. The positions of treatment can be taught to patients and family to reduce office visits and give patients some control of their aches and pains.

Still osteopathic techniques require a substantial amount of knowledge of functional anatomy and skill. By placing the patient in a position of ease and moving toward the pathological barrier slowly with compression or distraction, one can restore function to a facilitated segment. As it does require a gentle movement toward a pathological barrier, it may be contraindicated to the second group of advanced disease patients.

Osteopathy in the cranial field offers the patient a reduction in allodynia or chronic pain. By relieving significant cranial strain patterns, or even by the CV 4 cranial technique, the sympathetic nervous system response to pain is better balanced. The skill level on this osteopathic technique requires postgraduate training as to the application, diagnosis, and actual techniques. It is commonly taught at the basic level at all osteopathic medical schools. It can be used to give a sense of well-being, to reduce pain and help the posture and balance problems associated with osteoporosis.

Final Notes

In summary, the osteopathic approach to osteoporosis includes today’s medicines, supplements, and a high-protein diet. It also offers some pain control and activity improvements. The use of bisphosphonates and selective estrogen receptor modulators (SERMs) assists the patient in maintaining bone density and building bone.

In concert with the above osteopathic approach and mineral supplementation, successful treatment is far more likely. Proper bone density monitoring affords an important example of using technology for preventive medicine. The osteopathic patient can expect a holistic approach to the problem with prevention through diet and exercise, control of exiting disease processes, medicine choices, and—when indicated—OMT.

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Osteoporosis can be a devastating disease. The National Osteoporosis Foundation (NOF) estimates that there are 29.6 million women in this country currently with low bone mass or osteoporosis. The number is projected to increase to 35.1 million by the year 2010. This results in more than 250,000 hip fractures and 750,000 vertebral fractures annually.

Fortunately the list of available treatment options continues to grow. Current FDA-approved therapies are divided into two groups: antiresorptive therapy and anabolic therapy.

**Antiresorptive therapies**

Antiresorptive therapies work to reduce the number and function of the osteoclasts, the cells responsible for removing old and damaged bone. This allows the osteoblasts (the cells responsible for depositing new bone) to continue to function. Anabolic therapies stimulate both osteoclasts and osteoblasts, but they stimulate osteoblasts more, resulting in a net gain in bone.

Normally the process of bone resorption and bone formation is coupled and there is no net gain or loss. Following menopause and in some other disease states this process becomes uncoupled, resulting in the osteoclasts removing more bone than the osteoblasts deposit. This results in a net loss of bone.

All prevention and treatment of osteoporosis starts with what the NOF calls “Universal Prevention and Treatment Strategies,” including adequate daily intake of calcium and vitamin D; regular weight-bearing and muscle-strengthening exercise; fall-prevention strategies when appropriate; and a healthy lifestyle that includes avoiding smoking and excessive alcohol.

Antiresorptive therapies currently approved by the FDA for treatment and/or prevention of postmenopausal osteoporosis include:

- Bisphosphonates–Alendronate, Risedronate
- Calcitonin–Miacalcin
- ET/HT–many formulations
- Selective Estrogen Receptor Modulators–Raloxifene

**Anabolic therapies**

Anabolic therapies currently approved by the FDA for treatment and/or prevention of osteoporosis include:

- Parathyroid hormone–Teriparatide (PTH 1-34)
Treatment specifics
Following are six treatment options:

**Calcitonin** has been shown to reduce vertebral fractures in women with osteoporosis with previous fractures. It has not been shown to reduce nonvertebral or hip fractures. It can be given as a single daily nasal spray of 200 IUs or a daily subcutaneous injection. Side effects to the nasal spray include nasal irritation and runny or bloody nose. Side effects to the injection include nausea, headache, and vomiting.

**ET/HT** in the prevention and treatment of osteoporosis changed, following release of the results from the Conjugated Equine Estrogen/Medroxyprogesterone Acetate (CEE/MPA) arm of the Women’s Health Initiative (WHI) in May 2002. This study showed that if 10,000 women were prescribed CEE/MPA at a dose equivalent to .625 to 2.5 mg daily, there would be seven more cardiac events, eight more strokes, 18 more venous thromboembolic events, eight more invasive breast cancers, six fewer colorectal cancers, five fewer hip fractures, and five fewer vertebral fractures. This prompted the FDA in January 2003 to issue some recommendations regarding using ET/HT for prevention and treatment of osteoporosis. The FDA recommends:

- When prescribing medication to prevent osteoporosis, physicians should consider all non-estrogen preparations first.
- When prescribing ET/HT, physicians should prescribe the smallest dose for the shortest amount of time to achieve treatment goals.
- Physicians should prescribe ET/HT products only when the benefits are believed to outweigh the risks for a specific patient.
- **ET/HT** is still indicated for the prevention of osteoporosis in postmenopausal women and may still be a good choice for some women. Our message is that hormone therapy needs to be individualized to the patient, and the patient’s risk vs. the benefits of therapy must be weighed.

**Raloxifene** acts as an estrogen agonist on bone but as an estrogen antagonist on both the breast and uterus. It has been shown to reduce vertebral fractures but not nonvertebral or hip fractures. It is taken as a 60 mg tablet once a day with or without meals. Side effects include hot flashes, leg cramps and increased incidence of VT Es similar to that seen with estrogen (28/100,000).

**Alendronate** has been shown to reduce fractures at the spine, hip, and forearm. It has been shown to increase and maintain bone density for 10 years. Prevention dose is 35 mg once a week or 5 mg daily. Treatment dose is 70 mg once a week or 10 mg daily. It should be taken in the morning on an empty stomach with a full glass of water. The patient should remain upright and fasting for 30 minutes. Side effects include abdominal pain, nausea, heartburn, musculoskeletal pain, and very rarely esophageal or gastric ulcers.

**Risedronate** has been shown to reduce fractures at the spine and hip–within six months, with antifracture, efficacy demonstrated to five years. It has been shown to increase and maintain bone density for seven years. The dose is 5 mg daily or 35 mg once a week. Like Alendronate, it should be taken in the morning on an empty stomach with a full glass of water. The patient should remain upright and fasting for 30 minutes. Side effects include abdominal pain, nausea, heartburn, musculoskeletal pain, and very rarely esophageal or gastric ulcers.

**Teriparatide** has been shown to decrease vertebral and non-vertebral fractures. It is indicated for postmenopausal women at high risk for fracture. This includes women with osteoporosis who have multiple risk factors for fracture or who have fractured previously. It is given as a daily injection of 20 mg subcutaneously. The FDA has limited its use to two years due to an increased incidence of osteosarcoma that was seen in earlier animal studies. No such tumors have been seen in human trials. Side effects include nausea, leg cramps, hypotension, and transient hypercalcemia.

Indeed there are many highly effective therapies to choose from for the prevention and treatment of postmenopausal osteoporosis. It is important for physicians to become familiar with each, their use, risks and side effects and to individualize therapy to a patient’s individual needs.

M. Jill Gronholz, DO, is in private family practice in Coeur d’Alene, Idaho, and is the medical director of Bone Density of North Idaho. Prior to this she was in private family practice in Pocatello, Idaho, for 15 years and served as the director of the Southeast Idaho Osteoporosis Center for six years.
The application of glucocorticoid therapy for treatment of various inflammatory and autoimmune diseases has led to its widespread use in recent decades.

While treatment with glucocorticoids often results in suppression of the aggravating symptoms for which it was prescribed, adverse side effects are all too common. Of special concern are the effects on bone metabolism, which can lead to marked bone loss during the course of treatment.

The American College of Rheumatology (ACR) estimates that 30% to 50% of all patients receiving long-term glucocorticoid therapy will sustain osteoporotic fractures as a result of this process.

Glucocorticoids impact bone metabolism both directly and indirectly. Male and female gonadal sex hormones, as well as adrenal androgens, are inhibited by steroid therapy, limiting the anabolic effects of these hormones.

Decreased intestinal calcium absorption and increased calcium excretion can lead to development of secondary hyperparathyroidism resulting in disruption of calcium homeostasis. Bone loss as a result of these mechanisms is most significant in trabecular bone, which accounts for the prevalence of vertebral fractures in patients with osteoporotic disease.

The effects of glucocorticoid therapy are most pronounced at maximum dose and with greater cumulative duration of therapy. However, because effects on bone mineral density occur most rapidly during the first six to 12 months of therapy, preventative measures are recommended at the onset.

It used to be thought that negative effects were noted only at a dosing level greater than 10 mg per day of prednisone. The current ACR guidelines suggest that patients beginning therapy with glucocorticoids (prednisone equivalent of 5mg/day or more with plans for treatment duration of greater than three months) should be evaluated for preventive treatment of osteoporosis.

As a clinician, I tend to start my patients on 7.5mg/day. This needs to be decided on a case-by-case basis. High dose prednisone, i.e., 15 to 30 mg a day, can lead to a bone loss of 15% to 50% over 12 to 18 months, the most significant loss occurring within the first few months.

While there has been a heightened awareness of the problem in recent years, there are data to suggest certain specialties are less proactive when it comes to evaluating bone loss in patients undergoing glucocorticoid treatment.

In rheumatology, for example, a specialist may expect that a patient will only be on the standard yearlong therapy for polymyalgia rheumatica; however, two years into an unsuccessful weaning process, one might wonder if prevention and treatment of GIO from the onset would have been a wise choice.

Other specialties such as pulmonology and gastroenterology may face similar choices in assuming that treating flares of asthma or inflammatory bowel disease shouldn't require lengthy steroid treatment; however, many times this is not the case and patients are on steroids a long time. It remains controversial whether inhaled steroids contribute to GIO.

Depending on the specialty, use of other steroid-sparing medications is an option. Alternate-day steroid therapy is not considered protective. In rheumatology, great advances in both combinations of disease-modifying medications and the use of the newer biological therapies are key to keeping the steroid dose low in inflammatory arthropathies. Other specialties, such as gastroenterology, have used biologics (e.g., infliximab) for treatment of inflammatory bowel disease in patients as well. Pulmonologists often need to maximize their bronchodilator regimens to minimize steroid dependence.

Another important aspect of GIO awareness is recognizing the presence of osteoporosis when viewing X-rays and CT scans that have been ordered primarily for other diagnostic purposes. As an example, when back pain is being evaluated, the clinician should inspect the films not only for disc disease or arthritis, but also for concomitant osteoporosis or silent compression fractures as well.

Hand films obtained as a baseline for arthritis imaging can also be reviewed for the presence of osteoporosis. While family physicians or pulmonologists may tend to focus on the lung fields, a quick lateral view of the vertebral elements may pick up early, unidentified osteoporosis. Other diagnos-
tic data that are important include height measurements and evaluation of muscle strength and gait stability. Studies have shown the typical, frail 99-pound patient is at greater risk for fracture and fall due to a combination of gait and muscle balance risk factors.

Calcium and vitamin D supplementation at appropriate levels is a baseline strategy that should accompany all other prevention options. Physicians should first take a dietary history to assess the patient’s average natural food consumption of calcium per day. Physicians can then make recommendations to augment up to 1,000 mg calcium per day for low-risk maintenance or 1,500 mg per day for those at high risk for osteoporosis. Even before addressing supplementation with calcium and vitamin D, however, physicians should warn patients about the risks of heavy alcohol intake, smoking, caffeine, and carbonated beverages.

Another important issue to address is current bone mineral density status. A baseline DXA should be obtained to help assess the risk of each individual patient. The ACR Task Force on Osteoporosis recommends an anteroposterior DXA measurement of both the lumbar spine and femoral neck. However, if it is only possible to obtain one site, the lumbar spine is recommended for patients under 60 years of age, while a view of the femoral neck is suggested for those 60 years and older due to osteophyte formation at the vertebral bodies and facet joints.

Once a baseline DXA is obtained, a second DXA to measure efficacy of therapy should be obtained approximately 12 to 18 months later. In some cases, physicians might consider a repeat in six months. However, because the spine and hip are the best sites to assess bone loss, especially trabecular bone loss with steroid use, a DXA should be considered in every 12 to 18 months in most cases.

The risk profile of a 25-year-old athlete will be quite different than that of an 80-year-old retiree. Both should be encouraged to engage in weightbearing exercise and, when necessary, patients should be advised as to what types of activities qualify. Swimming and bicycling, for example, are not good choices for weight-bearing exercise. In cases where fractures have already occurred, referral to a physical therapist may be indicated, as there are certain movements that should be avoided, particularly those that cause significant back flexion such as toetouches.

Young female athletes that present with osteoporotic fractures should be evaluated hormonally to review estrogen status. A workup for secondary causes of osteoporosis may also be in order in senior citizens to rule out other coexisting causes of osteoporosis such as multiple myeloma, thyroid dysfunction, or vitamin D abnormalities. Other medical issues such as hypertension and the choice of diuretic may be important in that a thiazide may help retain calcium whereas a loop diuretic may be calcium wasting.

Typically, I recommend aggressive treatment in cases where a DXA scan shows osteoporosis with a T-score that is worse than (or below) -2.5. The ACR guidelines state if BMD is not normal, i.e., T-score less than -1, then you are to begin treatment. In some cases this is much too early and preventative.

Bisphosphonates such as alendronate (Fosamax) and risedronate (Actonel) have for years been the backbone of osteoporosis treatment and prevention. Risedronate has been shown in controlled studies to be an excellent agent in the prevention of GIO. Dramatic results within six months were shown in the Risedronate Steroid Bone Loss Prevention and Treatment trials with a decrease in fracture rate of up to 70%. While estrogen, raloxifene, and calcitonin may have a role in the treatment of those who cannot tolerate bisphosphonates, they remain a secondary choice. If on repeat DXA there is no improvement or T-score has decreased further, consideration of combination therapy may be warranted.

With the advent of teriparatide (Forsteo), new options exist for those who need rapid advancement in their bone density when they are already fracturing. There currently is debate over whether the sequence of teriparatide before bisphosphonates or vice versa limits the prior therapy. Bisphosphonates appear to be the logical choice in the prevention arena, whereas teriparatide should be reserved for the more extreme cases of osteoporosis with ongoing fracture.

Future directions in therapy may advance toward longer intervals between doses, such as monthly oral or IV bisphosphonate therapies. Other ideas that warrant research include the role of combination therapies and optimization of sequencing of therapies. Current research continues to look for development of a safer steroid and for use of other steroid-sparing medication options.
Osteoporosis: From Prevention to Treatment

By Joyce Flory, PhD

This issue’s panel covers osteoporosis risk factors, prevention strategies, testing, diagnosis and treatments. Our panelists conclude that osteoporosis can cause many changes that women can’t recognize on their own, but can be identified through screening tests. Women at risk must be screened, say the panelists, and DOs must initiate treatment to avoid dangerous bone fractures if osteoporosis is found.

However, DOs must also work to counsel women under age 35 to build bone strength through a healthy diet and regular exercise, while advising women beyond age 35 to prevent bone loss through calcium and vitamin D, weight-bearing exercise, and falls prevention.

Bone mineral density testing is still the easiest and most accurate measure of osteoporosis risk, say the panelists, with the most common tests including dual-energy X-ray absorptiometry (DXA), quantitative computed tomography (QCT), peripheral DXA or QCT, and peripheral heel ultrasound. Osteoporosis treatments may include the use of bisphosphonates, such as Actonel (risedronate) or Fosamax (alendronate), Micacalcin (a calcitonin nasal spray), Evista (raloxifene), and Foreteo spray), Evista (raloxifene), and Foreteo (teriparatide, also known as PTH (1-34)).

Joyce Flory, head of Chicago-based Communications for E-Business and Health, spoke with four osteopathic physicians about osteoporosis. Included in this roundtable were:

- Angela DeRosa, DO, West Coast senior medical director, Procter & Gamble Pharmaceuticals, Professional and Scientific Relations, American Osteopathic Foundation Board of Directors, and Laguna Beach Community Clinic volunteer.
- M. Jill Gronholz, DO, is in private family practice in Coeur d’Alene, Idaho, and is the medical director of Bone Density of North Idaho. Prior to this she was in private family practice in Pocatello, Idaho, for 15 years and served as the director of the Southeast Idaho Osteoporosis Center for six years.
- Jan I. Maby, DO, is currently the chief of Geriatrics and director of the Medical House Call Program at North General Hospital, a physician based home-visit practice serving the frail elderly of Harlem. Previously she served as the director of the Osteoporosis Program and Bone Density Lab at Mount Sinai Medical Center.
- Gary Jay Silverman, DO, serves as clinical faculty at the Arizona College of Osteopathic Medicine of Midwestern University. He is a fellow of the American College of Rheumatology and a Fellow of the American Osteopathic College of Internists.

DeRosa: We’ve certainly seen a shift in thinking over the last five to ten years on how to manage it. We’ve done more research into testing modalities, such as micro CTs and MRI. We’ve seen a huge leap in prevention and treatment of the disease although we have a ways to go. There has also been a movement from hormonal to nonhormonal options such as PTH and bisphosphonates. In the past we have hung our hats on bone mineral density testing, but we now see bone quality and bone strength as being equally as important.

Gronholz: Bone density is a surrogate marker for bone quality. Bone quality is more significantly correlated with fracture reduction, while bone density has no linear relationship with fracture reduction. Small increases in bone density can result in large reductions in fracture, while small losses in bone density can result in large increases in fracture, especially in the elderly population.

Maby: Achieving optimal bone health and preventing fractures is a lifelong process. We once thought osteoporosis was a natural part of aging, but we now know that it’s a preventable and treatable illness.

Flory: What types of individuals do you see in your practice?

Silverman: We’re seeing a broad range of patients demanding and interested in treatment. Clinicians realize that no one is out of bounds for possible diagnosis and treatment. For instance, I treated a 25-year-old basketball player with inflammatory arthritis. We knew he was going to be on at least 20 mg of steroids daily for at least a year and a half to two, so we monitored his bone health.

Flory: What about younger women and girls?

Maby: As generation Xers age, we’ll see a higher prevalence of osteoporosis as more women enter the postmenopausal years often with a history of low calcium intake, sedentary lifestyle, and smoking. These behaviors are stressors on bone health and lead to a decrease in bone density in women. As primary care physicians, we should target women because they can educate their children through healthy lifestyle habits that can prevent many diseases, including osteoporosis.
Our young women are so concerned with being thin that they forget about being healthy. Here in Southern California we have girls who are running to the point of anorexia. They don’t drink dairy products at all; choosing diet soda instead. Our society has a strong drive for pills that fix problems immediately, with no prevention. These girls may just decide to do the damage and assume that there will be a pill they can take later on. To some extent they’re right, but they’re setting themselves up for real problems.

**DeRosa:** Our young women are so concerned with being thin that they forget about being healthy. Here in Southern California we have girls who are running to the point of anorexia. They don’t drink dairy products at all; choosing diet soda instead. Our society has a strong drive for pills that fix problems immediately, with no prevention. These girls may just decide to do the damage and assume that there will be a pill they can take later on. To some extent they’re right, but they’re setting themselves up for real problems.

**Flory:** What are some common osteoporosis myths?

**Gronholz:** A myth I encounter fairly frequently is that calcium, vitamin D and exercise are substitutes for Food and Drug Administration (FDA) approved medications for treatment of osteoporosis. While there are good fracture data related to taking calcium and vitamin D, all FDA medication studies featured placebo groups that took calcium and vitamin D. So calcium, vitamin D, and exercise are no substitute for FDA approved medications for the treatment of osteoporosis. The other myth is related to those patients who equate joint pain or arthritis with osteoporosis. These patients think that if they have back pain, they must have osteoporosis. People aren’t aware that osteoporosis is a silent disease. You can have it even when you have no symptoms.

**Flory:** What can we do to prevent osteoporosis?

**Maby:** Eat right and exercise. This isn’t just for osteoporosis. It’s the backbone to a comprehensive approach to good health. The calcium guidelines are 1,000 or 1,200 to 1,500 mg a day for adults, in addition to 400 IUs of vitamin D, while seniors should increase their vitamin D intake to 800 IUs. Calcium is naturally found in dairy-based foods, many of which are avoided because of fat content. Happily, calcium is fortified in many fruit juices and breads. So it’s not as difficult to get calcium through diet as it once was. For motivated patients there are many tricks like adding powdered milk to soups and putting cheese on salads to increase calcium intake in the diet. It’s more difficult to obtain vitamin D from food. The most common natural source of vitamin D is exposure to the sun. Four hundred (400) IUs of vitamin D is commonly found in over the counter multivitamins. However, vitamin D deficiency is actually quite prevalent in the elderly because many elderly are home bound or avoid the sun. So seniors require supplementation.

**DeRosa:** Citrate and carbonate products deliver specific doses of elemental calcium. For instance, carbonate products give you only 40% elemental calcium, while citrate products give you 21%. The citrate products tend to be a little more expensive, but they’re better tolerated and absorbed than carbonate products. People think that if they take their 1,200 to 1,500 mg of calcium in one shot, they’ve done their day’s work. But the body is only capable of absorbing 300 mg at a time, so people need to split their doses. There’s also been a push for designer-type calcium products. Patients pay a lot of money for them, but they’re not any better than the carbonate or citrate products. Plus, patients may incur hard metal poisoning from certain types of these products if they’re not careful.

**Silverman:** Whenever I do osteoporosis counseling, I take a dietary history to determine how much calcium is being taken. Some patients say, “Yes, I drink six cups of milk a day,” which makes my job fairly easy. But I would estimate that the average person is taking 300 to 500 mg of calcium a day via natural foods. I don’t think they ever reach 1,000 to 1,500 mg a day. If that’s the case, I have to say, “We prefer you get your calcium in food, but if you’re not getting the right amount, you need a supplement.”

**Flory:** What are physicians missing?

**DeRosa:** Many physicians are not appropriately screening and managing the most obvious patient with osteoporosis—those with hip fracture and vertebral fractures. Too often, they are screening the worried well. Forty-year olds come in and demand a DEXA scan regardless if they need it or not. On the opposite side, if a patient walks into an orthopedist’s office with a hip fracture, that orthopedist might not even be aware that the patient has osteoporosis.

**Gronholz:** Physicians are trained to treat a disease once it arrives. It takes more time to go through a risk assessment and institute preventative strategies. Because osteoporosis is a silent disease and doesn’t cause symptoms until a fracture occurs, many patients aren’t motivated to change their lifestyle. They make bad lifestyle choices by smoking, by not taking adequate calcium, and by not exercising regularly.

**Maby:** The regulatory bodies and guidelines haven’t really assisted practicing clinicians in developing an awareness of osteoporosis. Medicare has only recently covered bone density testing as a screening tool. Although the United States Public Health Task Force came out with a position statement about osteoporosis screening, many organizations still haven’t published position statements on osteoporosis. Physicians tend to follow the guidelines of parent organizations as standards of care are developed and become mainstream. Physicians must improve their awareness of the prevalence of osteoporosis and osteoporotic fracture, as we’re facing an epidemic. Today we have excellent diagnostic tests and treatment options for our patients, so there’s no excuse for physicians to not incorporate questions about risk factors for osteoporosis into their practices.

**Gronholz:** I would challenge physicians to ask patients how tall they were at age 30 and then measure patients’ heights every year when they come in for their physical. A half-inch height loss predicts increased risk of an osteoporotic fracture. Since two-thirds of fracture patients are asymptomatic, loss of height is sometimes the first clue that something is going on.
Flory: How do you get patients to take medications and change lifestyle?

DeRosa: Compliance is one of our biggest issues. We have to get patients who we’ve diagnosed with osteoporosis and started treating to continue their medications. Unfortunately, once patients reach the one year mark with medications, approximately 50% of the patients decide to stop their medications, many times without informing their physicians.

Gronholz: I’m continually frustrated about how to encourage people to become regular exercisers with weight-bearing resistive exercises. There’s a lot of exciting research going on, but it’s hard to get people to change lifestyle. And getting patients compliant with medication is more difficult when you’re doing prevention than when you’re doing treatment. Once patients go through a fracture, you’ve got their attention. They’re willing to take the time, spend the money, and put up with side effects.

Silverman: A support group type approach might work with some patients. Patients who go through intensive programs tend to stick with lifestyle changes. So a women’s wellness group might work if it included exercise, diet, osteoporosis, and cholesterol. Patients who experience fractures get religion quickly, but even these people fall off the wagon, or they become obsessive compulsive with their regimen. Many patients get lazy with vitamins, calcium, and medications due to cost and the discipline of taking them. Physicians and nurse practitioners can help by arranging more frequent well women visits for coaching, motivation, and monitoring. Down the road, we may have the benefit of once a month or once a year medications. But behaviors like daily exercise and calcium intake will still require health professional coaching.

Maby: It boils down to the physician nurturing the doctor-patient relationship and becoming the coach. There will always be patients at either end of a bell-shaped curve—those who never comply, and those who comply by telling you the exact time they take a medication or every morsel of food they eat. In general, however, our greatest impact in compliance is through a good doctor-patient relationship. When appropriate, pick a medication together, make sure it fits in terms of side effects, cost, and dosing, and always remain available for questions.

Flory: What about DXA scans?

Maby: DXA is clearly the gold standard for the diagnosis of osteoporosis. It’s accurate, precise, fast, low in radiation, allows us to establish the diagnosis, and predicts the risk of fracture. It also can assess changes in bone mass over time, help us monitor therapeutic efficacy, and even enhance adherence to treatment.

Gronholz: For screening purposes in women under age 65, central DXA—hip and spine—is the modality of choice. In women over age 65, heel DXA or ultrasound for hip fracture prediction is close to hip fracture prediction from a DXA of the hip.

Flory: When do you recommend baseline scans?

Silverman: Menopause is a good time for baseline screening. However, there may be a young male patient, an elderly male patient, or an atypical young female in her 30s with many risk factors. Menopause should be seen as a time to think about screening most women, but let’s not ignore the patients who may have other conditions.

Maby: I screen according to current recommendations, meaning that if a patient were younger than 65, she would need to have other risk factors for osteoporosis or risk factors for fracture. There are no FDA approved therapies for premenopausal osteoporosis. Therefore, routine screening for these women shouldn’t be undertaken.

Gronholz: The National Osteoporosis Foundation recommends scanning women who are menopausal, under age 65, and have one or more risk factors. At age 65, NOF recommends all women get scanned. The International Society of Clinical Densitometry goes one step further and recommends that men over age 70 be scanned.

Flory: How do you choose the medications that you prescribe?

DeRosa: Five to ten years ago we only had hormonal options and calcium. Now things have changed. We still have the hormonal therapies available. The Women’s Health Initiative shows that estrogens are helpful in preventing fractures. Physicians knew this anecdotally but now we have conclusive proof of this. We now have designer estrogens, SERMs, but have also added to our armamentarium bisphosphonates and PTH. Calcitonin is still available but has lost much of its luster. I mainly use them in acute fracture patients for pain management.

I like to use the estrogen therapies and SERMS for prevention and low to moderate osteoporosis. Raloxifene can have the added benefit of breast cancer risk prevention. Bisphosphonates are the gold standard for the prevention and treatment of osteoporosis and there are several options, including daily and weekly dosing of risendronate and alendronate—although Rise-dronate studies show a superior GI safety profile, faster onset to fracture reduction and long term safety. I reserve PTH for patients who have failed with everything else. I set up appointments so that I counsel on lifestyle, calcium, and vitamin D prior to starting a medication. I’ve seen bone pain, side effects, and adverse events in patients who’ve started medications without adequate calcium and vitamin D levels. Patients also assume that if they start a medication, they no longer need calcium and vitamin D.

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What happens to people’s bones as they get older?

As women grow older, they experience some bone loss. But there’s a difference between bone loss related to natural aging and bone loss related to the depletion of hormones such as estrogen and progesterone, which tends to come with menopause.

Estrogens are important because they help to balance the destruction of old bone and the formation of new bone.

When your estrogen levels drop, bone loss speeds up and your bones become more fragile. After age 30 or so, women lose bone at the rate of .5 to 1% per year. But around the time of menopause, women lose bone at the rate of as much as 3 to 5% per year. This means that women can lose more than 20% of their skeleton in just four to five years, even if they’re taking the right amounts of calcium. The result is that women have less bone strength and are at a higher risk for serious fractures.

How does bone loss relate to osteoporosis?

Osteoporosis is the long-term loss of bone tissue. It affects 20 to 25 million Americans, with predictions that it will affect 50 million people by 2050.

Osteoporosis is often called the “silent disease” because there are no symptoms until a woman has a fracture. It’s good to know that some medications can slow or alter the course of osteoporosis. In some cases, these medications can actually build bone.

But osteoporosis isn’t the same as arthritis. Arthritis damages the joints, while osteoporosis affects bone tissue and the inside structure of the bone. However, there are women who have both osteoporosis and arthritis.

How are women affected by osteoporosis?

More than 1.5 million women in the United States suffer fractures because of postmenopausal osteoporosis. The most common fractures happen in the spine, wrist, and hip. If a woman has serious osteoporosis, she might experience a crushed fracture of the spine from doing little more than lifting, bending, getting up from a chair, or coughing.

These painful fractures can cause deformity of the spine as well as a loss in height. While hip fractures aren’t as common in women, they seriously change women’s lives and affect life expectancy. Close to 25% of women with hip fractures don’t live more than a year. Another third of these women never leave a nursing home or rehabilitation facility.

Can men get osteoporosis?

Osteoporosis is less frequent in men because men reach a higher peak bone mass and because hormones have a less important role in bone health for men than for women. But a man still has a 30% risk of having an osteoporosis-related fracture in his lifetime. One-third of men who suffer a broken hip die within a year, and less than half of those who survive manage to regain the independence they had before the fracture.

Major risk factors for men include old age, since the speed of bone loss increases with age. Also important are nutrition, physical activity; and factors such as alcohol, caffeine, smoking, low levels of sexual hormones such as testosterone, and genetics.

Many men have secondary osteoporosis, which results from another medical condition such as COPD or ongoing use of some medications such as steroids. Men should work with their physicians to evaluate personal risk for osteoporosis.

What are the risk factors for osteoporosis?

Risk factors can be broken down in two categories: factors you can’t control and those you can.

Factors you can’t control include a family history of osteoporosis, which might show up in hip, wrist, and spinal fractures or curvature of the spine. Other uncontrollable factors include being female, small boned, White or Asian, removal of the ovaries or menopause before age 45, irregular menstrual cycles brought about by eating disorders or intense exercise, and prolonged use of medications such as heparin, anticonvulsants, corticosteroids, antacids containing aluminum, and thyroid hormones.

However, there are many factors you can control. These include smoking, exercise, diet, caffeine and alcohol consumption.

Ask yourself: Do I walk at least 30 minutes three times a week? Do I have no more
than two alcoholic drinks per day? Do I eat three food servings to reach my 1,500 mg daily requirement for calcium? Do I have no more than three caffeinated beverages per day?

What are some of the other conditions that can influence bone health?

These conditions include hyperthyroidism, hyperparathyroidism, Cushing Syndrome, hypogonadism, chronic kidney disease, organ transplant, multiple myeloma, Crohn’s disease, gastric surgery, and celiac disease.

Taking some medications over a long period of time can also lead to osteoporosis. These medications include corticosteroids, anticonvulsants, heparin, thyroid hormones, gonadotrophin-releasing hormone, antineoplasics, and antacids containing aluminium. But no one should stop taking a medication or reduce a dose in the hope of preventing bone loss. If you think you’re at risk for secondary osteoporosis, discuss a plan of action with your physician.

How is osteoporosis diagnosed?

Loss in height, curvature of the spine, and pain happen only after spinal fractures. Physicians can use an ordinary X-ray to detect osteoporosis, but usually by the time you can detect bone loss on the X-ray you may already have lost 30% of your bone.

Many physicians have turned to bone densitometry or bone mineral density (BMD) testing. Here the physician uses a specific type of X-ray to measure the amount of bone tissue in the lower part of the spine or in the hip. The standard diagnostic tool is the Dual-Energy X-ray absorptiometry (DXA) scan.

How is osteoporosis treated?

Many physicians still use hormone therapy (HT) to replace the hormones a woman stops producing at menopause. While some physicians worry about the risk of breast cancer associated with taking hormones, others believe that they help to curb the loss of bone tissue and may be appropriate in certain women.

Selective estrogen receptor modulators (SERMs) reduce the loss of bone tissue and the risk fractures. Raloxifene/Evista is just one of the SERMs physicians use to prevent or treat osteoporosis. Raloxifene has been shown to reduce the risk of invasive breast cancer; however, it needs to be used cautiously with women with coagulation disorders and hot flashes.

Bisphosphonates are non-hormonal medications that act on bone remodeling. They work to limit the activity of osteoclasts, the cells responsible for bone destruction. They also reduce loss of bone mass and decrease the risk of spine and hip fractures. These are the current gold standard in the prevention and treatment of osteoporosis. Among these bisphosphonates are alendronate/Fosamax, and risendronate/Actonel.

Calcitonin also affects bone remodeling. It reduces the action of osteoclasts—the cells responsible for bone destruction, cuts down on loss of bone mass, decreases the risk of fractures, and helps manage the pain of recent fractures. This drug is usually used in the acute fracture patient in which pain relief is desired. Since the bisphosphonates came on the market, they are usually reserved as a second line drug after others have been tried and failed. Synthetic salmon calcitonin is available in the form of a nasal spray.

Other medications used to prevent or treat osteoporosis include testosterone, which is used in men, and specific forms of vitamin D, which doctors suggest along with calcium and prescription medications.

Parathyroid Hormone (PTH) is produced by the human body, which helps to regulate use of calcium and bone remodeling. This hormone is different from other drugs. Instead of just slowing down the destruction of bone, it actually stimulates bone formation. This drug comes in a daily injectable form and is usually reserved for patients who have failed all other treatment options.

If I already have osteoporosis, what can I do?

Take your medication, as well as calcium and vitamin D. Also do weight-bearing exercises such as walking and weight lifting, which increase stress across your bones. But check with your physician before you begin an exercise program or make changes in your diet.

To get 1,500 mg of calcium daily, try foods such as skim milk, yogurt, cheese, low-fat ice cream, canned salmon or sardines, tofu, or broccoli. But remember that each of these foods has varying amounts of calcium. For example, while an eight-ounce cup of yogurt has as much as 450 mg of calcium, an ounce of cheese has a maximum of 250 mg of calcium, and a half-cup of ice cream has just 100 mg.

How early can you start to work on preventing osteoporosis?

It’s never too early. Women build bone mass during childhood, adolescence, and early adulthood. The teenage years are important because constant dieting and eating disorders can lead to a loss of nutrients and hormonal imbalances. As women become adults they need to maintain bone mass by limiting the habits that cause bone loss. Menopause is the time when women need to work with physicians to evaluate risk factors and bone loss.

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Gronholz: The Women’s Health Initiative taught us to individualize therapy. Once we review patients’ bone density, co-morbid conditions, and risks for fractures, we can recommend one or two medications, such as bisphosphonates, SERMs, or estrogen. The best medication for patients is the medication they will take. I review the side effects and risks of each medication with patients and let them pick. If I can partner with my patients and help them choose the medication they can best tolerate, they’re typically more compliant with therapy.

Silverman: As a rheumatologist I probably see a different population than generalists out there. I use all available drugs, but bisphosphonates are the backbone of my practice. I either go into combination therapies, upgrade to Forteo, or return to lower level therapies because of the failures or the side effects of bisphosphonates. Bisphosphonates are central—not because they’re wonder drugs or the perfect choice, but because some people may already have severe or moderately severe osteoporosis. I think we’ve made great strides in the last ten to 15 years. I’ve been treating osteoporosis before it was even treatable, when calcitonin injectable was the only thing around. If patients who already have osteoporosis by their late fifties or sixties had been screened earlier, they wouldn’t be needing rheumatology visits and bisphosphonate therapy.

To BMD or Not to BMD: Taking a Holistic Approach

Bone Mineral Density (BMD) is the current best determinant for bone mass and the gold standard for diagnosis. However, this is not the complete story. One must take into consideration the whole patient. We have learned that there is more to risk of fracture than just the patient’s BMD T-score.

We must look at the risk factors such as history of fracture, maternal history of fracture, age, menopausal status, fall risk, etc. In addition, we need to address the issue of bone quality not just density.

We now know that bone quality is more significantly correlated with fracture reduction, while bone density has no linear relationship with fracture reduction. Small increases in bone density can result in large reductions in fracture, while small losses in bone density can result in large increases in fracture.


Bone turnover is assessed by bone turnover markers such as NTX, and Alkaline Phosphatase. Turnover markers also do not have a linear relationship with fracture reduction.

Architecture is looking at the trabecular and cortical elements for size, shape, spacing and connectivity. Microdamage can accumulate if bone resorption is insufficient to repair day-to-day bone microfractures.

Mineralization is affected by collagen cross-linking and Hydroxyapatite in the bone structure. All these elements must be in sync or we could have defective bone as in osteomalacia.

Take note that bone strength and quality is accounted for by many facets. As osteopathic physicians, we can all relate to the broader more holistic approach to medicine and osteoporosis is no different. We must look at the big picture of fracture risk and not just the BMD. The only true marker of success is how we address all the components of their risk of fracture and treat with medications that have shown a superior ability to reduce fractures and not just increase BMD.

Angela DeRosa, DO