Bone Health: Not Just for the Elderly

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Osteoporosis and altered bone metabolism is not just a disease of the elderly. We all know about and are beginning to understand the burden of osteoporosis. There are more than 2 million osteoporosis-related fractures in the United States annually, and with the aging population, that incidence is expected to increase during the next several years and be more than 3 million fractures by 2025.\(^1\) The related cost to society is staggering: billions of dollars. There has been much emphasis on hip fractures in the elderly population. A 50-year-old American woman has an estimated lifetime risk of 17.5% of having a hip fracture and of 15.6% of having a vertebral fracture.\(^2\) Osteoporosis is also prevalent in males, but often not tested for or thought of until there is an osteoporosis-related fracture.

However, the burden of osteoporosis is not just related to hip fractures in the elderly; it includes vertebral compression fractures, which can be much deadlier than hip fractures in the elderly. There are more than 500,000 vertebral compression fractures in the United States annually, and this is thought to be underestimated because many may go undiagnosed.\(^3\) In addition, vertebral compression fractures also represent more than a billion dollar cost to society with patients hospitalized due to pain, and the long-term consequences of one vertebral compression fracture are compounded by the risk of additional vertebral compression fractures. Distal radius fractures and proximal humerus fractures are additional fractures that can occur due to the burden of osteoporosis.

Education on the diagnosis and treatment of osteoporosis is expanding. Most major orthopedic meetings feature papers, posters, and/or education sessions related to the topic. Those of us in academic institutions make sure the resident understands the definition of osteoporosis, knows what the T-score is, can calculate a Fracture Risk Assessment Tool (FRAX) score, and often considers, at the minimum, starting vitamin D and calcium for patients with hip fractures.

There are an abundance of programs related to osteoporosis in the elderly. The American Academy of Orthopaedic Surgeons has several osteoporosis awareness campaigns and public service announcements. In addition, there are multiple other organizations that provide information and education, including the National Osteoporosis Foundation, which is dedicated to preventing osteoporosis and promoting strong bones for life. The National Osteoporosis Foundation is a founding partner of the National Bone Health Alliance. One of their campaigns is “2 Million 2 Many.” As part of this campaign, there was a cast mountain at the 2013 American Academy of Orthopaedic Surgeons meeting representing the 5500 fractures that occur every day due to osteoporosis. The significance of this is that only 2 out of every 10 breaks receive a follow-up test or treatment. The American Orthopaedic Association has a program called “Own The Bone.” This program provides tools to help hospitals and physicians evaluate and treat fragility fractures and coordinate care. The United States Bone and Joint Initiative has public awareness campaigns, including “Fit to a T” to educate about lower T-scores indicating an increased risk for fractures. With all of these public awareness campaigns available, there is no doubt that there is osteoporosis prevention and education for the elderly.

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However, we must start much younger in educating about and considering bone health. The key time to develop and make deposits into one’s “bone bank” is during childhood and young adulthood. Peak bone mass occurs by the age of 30. Optimum bone health requires a balance between quality and quantity of bone in the first 2 to 3 decades while individuals are working on achieving their peak bone mass. Just a 5% increase in peak bone mineral mass can decrease the risk of osteoporosis significantly.3

We need to educate young patients and parents to understand the factors and maintenance of bone health, and that includes calcium and vitamin D intake. Many times it is much more appealing to have a can of soda vs a glass of milk. Children now are spending more hours in front of the television and with video games, computers, and phones. Not only are children not getting enough exercise to develop strong bones, but they may also have inadequate exposure to vitamin D and there may be metabolic deficiencies. Vitamin D deficiency can occur in children who spend too much time watching television, but vitamin D levels also have been shown to be lower in certain climates in the winter months.4

According to Forbes Magazine, Red Bull and Monster are the top 2 energy drink brands and had almost $4 billion in sales combined in 2013.5 Energy drinks can contain as much as 15 times more caffeine than a can of soda. This can lead to dehydration and heart palpitations with exercise. Although studies are somewhat inconclusive regarding the effect of caffeine intake in children on bone metabolism, it is important to educate athletes about these drinks.

High school athletics is booming, and the participation of young girls and women in high school sports is definitely on the rise. Bone health in female high school athletes is a concern. The 3 components of the female athlete triad include decreased energy availability with or without disordered eating, menstrual dysfunction, and low bone mineral density.6 A higher rate of female athletes are presenting with at least one of the triad components.6 We must be aware of the triad. Early intervention is necessary to prevent progression to function- and life-threatening endpoints. These include anorexia, bulimia, cardiac arrhythmias, amenorrhea, and osteoporosis. A female with a stress fracture participating in sports should raise a red flag as to what components of the female triad she has and should be treated properly before returning to play. There should be awareness of and screening for eating disorders with the SCOFF questionnaire, a brief 5-question survey that can be used to screen for eating disorders.7

Bone health is also important for patients who have orthopaedic trauma. Many patients sustain fractures that may be slow to heal. A study by Brinker et al8 of patients with nonunion found that 37 patients were referred to an endocrinologist to undergo an evaluation for metabolic abnormalities. Overall, 31 of 37 patients had one or more diagnoses of metabolic or endocrine abnormalities, and 8 of these patients had healing of their fractures without operative intervention by treating the metabolic or endocrine abnormality.8 It is important to counsel our patients not only about not smoking to promote fracture healing but also about metabolic and endocrine abnormalities, and the importance of vitamin D and calcium. In a study by Robertson et al,9 the effect of vitamin D therapy for patients with orthopedic trauma was evaluated. There were 88 patients who were vitamin D insufficient and 81 patients with vitamin D deficiency. Vitamin D therapy was initiated and improved the majority of the patients’ levels but did not normalize them.9

It is important that we question unusual fractures and fractures that do not heal, and that we have a low tolerance for the possibility of disordered bone metabolism affecting injury and outcomes. The orthopedic surgeon is more effective in the education of patients.2 We must consider osteoporosis and bone health at all stages of life.

REFERENCES