



Osteoporosis: A Major Problem - Worldwide

Ülkü Akarirmak*

Physical Medicine and Rehabilitation Department, Cerrahpaşa Medical School, İstanbul University, İstanbul, Turkey

Osteoporosis is characterized by reduced bone mass and deterioration in bone architecture, resulting in decreased bone strength, increased bone fragility and fracture risk [1]. Fragility fractures are associated with acute and chronic pain, morbidity, deformity, disability and increased mortality for patients. This also means major costs to society.

Hip fractures can cause loss of function and independence with 40%-60% of hip fracture patients being unable to walk independently or requiring assistance, and 33% being totally dependent or in a nursing home in the year following hip fracture. Osteoporotic fractures account for more hospitalization days than other diseases like breast cancer, myocardial infarction, diabetes and others. In men, the risk of an osteoporotic fracture is up to 27% higher than the risk of prostate cancer. Mortality rates are as high as 20-24% in the first year after hip fracture [2].

It is estimated that more than 200 million people are affected by osteoporosis. Nine million fractures annually are reported. Osteoporosis is common in both sexes and all parts of the World. About one in three women and one in five men over 50 years will suffer a fracture due to osteoporosis. By 2050, the incidence of hip fractures will increase dramatically. Certainly ageing populations are responsible for increases in the disease burden.

The majority of fragility fracture patients are not sufficiently assessed, diagnosed or treated by the health-care systems, therefore there is a failure to decrease risk of fractures and subsequent fractures [2]. A prior fracture is associated with an 86% increased risk of another future fracture, but only one third of vertebral fractures are diagnosed. About 80% of people with an osteoporotic fracture are not assessed or treated for osteoporosis. An extensive study performed in our country, but representing all regions of Turkey reported that most patients who had suffered a hip fracture in 2009, discontinued medical

treatment in the next eight years and had suffered one or more new fractures or died [3,4].

Prevention

General public recommendations are certainly an important tool in the prevention of osteoporosis. Prevention works on primary, secondary and tertiary levels in osteoporosis. This means prevention is still a valuable method for osteoporotic subjects as well as patients who have suffered from prior osteoporotic fractures [1]. Prevention primarily concentrates on osteoporosis risk identification, non-pharmacologic methods like life-style modifications, nutrition, exercises and falls prevention [2,5,6]. A special emphasis has to be put on vitamin D and calcium intake. Vitamin D deficiency is encountered worldwide in all ages and both sexes and calcium intake is frequently below the recommended levels especially in adolescents and elderly people, when intake is especially warranted [5,7,8].

The IOF One-Minute Osteoporosis Risk Test, is helpful to recognize personal risk factors for osteoporosis and fractures. Prior fragility fracture, hip fracture history in parents, long-term glucocorticoid use, female sex and old age are predictive of osteoporotic fractures.

Life-long, bone-healthy nutrition, according to various stages of life, including pregnancy, infancy, childhood, adolescence, postmenopausal period and senile ages are some of the keys to prevention [5]. Calcium, vitamin D and protein are the corner stones. For females

***Corresponding author:** Prof Dr. Ülkü Akarirmak, Physical Medicine and Rehabilitation Department, Cerrahpaşa Medical School, İstanbul University, İstanbul, Turkey, E-mail: akarirmak@istanbul.edu.tr

Received: August 11, 2017; **Accepted:** June 23, 2018;

Published online: June 25, 2018

Citation: Akarirmak U (2018) Osteoporosis: A Major Problem - Worldwide. Arch Sports Med 2(1):106-108

over 50 and males over 70 years, 1200 mg calcium/day and 800 IU of vitamin D/day are generally recommended. If vitamin D levels are lower than 20 ng/ml, daily doses are insufficient and patients need vitamin D replacement [1,5].

Together with weight-bearing and muscle strengthening exercises, both are important ways to prevent osteoporosis and falls & fractures [6-9].

Also we need to address various factors responsible for falls in the population over 65 years of age. Medication, co-morbidities like heart diseases, DM, neuromuscular and musculoskeletal problems, previous stroke, cognitive problems, gait problems, eye problems with impaired vision and a history of falls have to be checked in detail [6,7,10]. Improving balance is one of the substantial methods to decrease the risk of falls and fractures [6,10]. Balance training programs, like OTAGO and FAME, in all elderly persons as well as patients with stroke, Parkinson's disease etc. are approved on an evidence-based-level for fracture prevention and recommended by IOF's 'Fracture Liaison Services' [11,12].

Osteoporosis awareness is an important issue, so the World Osteoporosis Day on 20th October, the biggest awareness campaign for osteoporosis, by IOF, works on the importance of protecting bones and also the future. (www.worldosteoporosisday.org).

Osteoporosis Treatment

Osteoporosis treatment methods consist of medical (pharmacological) treatment, non-pharmacologic treatment and surgical treatment methods. All patients need to be assessed for secondary osteoporosis causes.

For patients at high risk for osteoporotic fracture, osteoporosis medication is prescribed. According to recommendations pharmacologic therapy is indicated for postmenopausal women with a history of fragility fracture or with osteoporosis based upon bone mineral density (BMD) measurement (T-score \leq -2.5) by DXA at lumbar spine, femoral neck or total hip regions.

Pharmacologic therapy is also recommended for the treatment of high-risk postmenopausal women with T-scores between -1.0 and -2.5. Fracture risk assessment can be performed by using the Fracture Risk Assessment Tool (FRAX) (FRAX website, according to countries is used widely). A 10-year probability of hip fracture of \geq 3.0% or major osteoporotic fracture or \geq 20% is a clear indication for pharmacologic treatment and follow-up.

Bone mineral density (BMD) evaluation assessed by DXA (dual energy X-ray absorptiometry) is generally performed for diagnosis of osteoporosis and it is well known that decreased BMD is associated with increased risk of fracture.

Guidelines for treatment of osteoporosis are published and regularly updated by major osteoporosis foundations like the International Osteoporosis Foundation-IOF, National Osteoporosis Foundation-NOF (USA) [1], national groups like NOGG (UK), societies etc. [1,7,9,13]. Treatment guidelines aim at evidence-based fracture prevention for patients with or without fracture.

Osteoporosis treatment consists of antiresorptive or bone formation stimulating agents. For patients without prior fragility fracture oral bisphosphonates, alendronate or risedronate and IV bisphosphonate zoledronic acid and SC denosumab are the first choice agents. Alternative therapies are ibandronic acid and raloxifene. For patients with prior fracture or estimated high risk for fracture denosumab, teriparatid or zoledronic acid (alphabetical order) are the first choice agents. Alternative therapies are the oral bisphosphonates, alendronate or risedronate [13]. Teriparatid is approved as bone forming agent and is especially recommended for patients with recurrent fractures. New bone formation agents like abaloparatide have been approved recently [14]. Patients at high risk for fracture have to continue for longer treatment years. Patient follow-up and treatment compliance certainly are the key to successful results. Patients have to be assessed for vitamin D sufficiency, as a deficiency may be responsible for treatment failure.

Surgical treatment of osteoporosis comprises vertebral & femoral augmentation techniques. Vertebroplasty and kyphoplasty techniques are used for spinal compression fractures with immediate pain relief. A systematic review of eight trials comparing vertebral augmentation with placebo or medical treatment showed significant pain improvement in both treatment groups at 1, 3, 12 months follow-up [15]. Femoral augmentation aims at prevention of hip fractures and provides a minimally invasive technique for the prophylactic reinforcement of the osteoporotic proximal femur, a possible treatment in high fracture risk osteoporosis patients [16].

Osteosarcopenia is another important issue in the follow-up and treatment of elderly osteoporotic subjects. Healthcare professionals should consider bone health evaluation for women over 50 and men over 70 years of age or anyone younger with osteoporosis risk factors. A Fracture Risk Assessment Tool (e.g. FRAX) is used widely for major osteoporotic fracture risk estimation and treatment decision. Clinical osteoporosis risk factors and diseases causing secondary osteoporosis, especially Rheumatoid arthritis, Diabetes mellitus, endocrine and gastrointestinal system increase the risk significantly. Bone mineral density (BMD) evaluation assessed by DXA is standard for diagnosis of osteoporosis [7].

Fracture Liaison Services (FLS) are coordinator-based,

secondary fracture prevention services implemented by health care systems for the treatment of osteoporotic patients to significantly reduce fracture risk. Also the rehabilitation of patients with fractures or spinal deformities by braces and postural exercises for restoration of daily living activities and pain control is an important aspect of the osteoporotic patient.

References

1. Cosman F, de Beur SJ, LeBoff MS, et al. (2014) Clinician's guide to prevention and treatment of osteoporosis. *Osteoporos Int* 25: 2359-2381.
2. Hernlund E, Svedbom A, Ivergård M, et al. (2013) Osteoporosis in the European Union: medical management, epidemiology and economic burden. A report prepared in collaboration with the International Osteoporosis Foundation (IOF) and the European Federation of Pharmaceutical Industry Associations (EFPIA). *Arch Osteoporos* 8: 136.
3. Tuzun S, Eskiurt N, Akarirmak U, et al. (2012) Incidence of hip fracture and prevalence of osteoporosis in Turkey: the FRACTURK study. *Osteoporos Int* 23: 949-955.
4. Akarirmak Ü, Tüzün S, Eskiurt N, et al. (2017) Long term follow up of subjects from a past study (FRACTURK study) for new fractures, mortality and morbidity. IOF-ECCEO-World Congress of Osteoporosis, Florence, Italy.
5. Weaver CM, Gordon CM, Janz KF, et al. (2016) The National Osteoporosis Foundation's position statement on peak bone mass development and lifestyle factors: A systematic review and implementation recommendations. *Osteoporos Int* 27: 1281-1386.
6. Giangregorio LM, Papaioannou A, MacIntyre NJ, et al. (2014) Too Fit To Fracture: Exercise recommendations for individuals with osteoporosis or osteoporotic vertebral fracture. *Osteoporos Int* 25: 821-835.
7. Kanis JA, McCloskey EV, Johansson H, et al. (2013) European guidance for the diagnosis and management of osteoporosis in postmenopausal women. *Osteoporos Int* 24: 23-57.
8. Prentice RL, Pettinger MB, Jackson RD, et al. (2013) Health risks and benefits from calcium and vitamin D supplementation: Women's Health Initiative clinical trial and cohort study. *Osteoporos Int* 24: 567-580.
9. Compston J, Cooper A, Cooper C, et al. (2017) UK clinical guideline for the prevention and treatment of osteoporosis. *Arch Osteoporos* 12: 43.
10. Madureira MM, Takayama I, Gallinaro AL, et al. (2007) Balance training program is highly effective in improving functional status and reducing the risk of falls in elderly women with osteoporosis: A randomized controlled trial. *Osteoporos Int* 18: 419-425.
11. (2006) A community-based group exercise program for people living with stroke. Guidelines & Manual 2006. FAME Fitness and Mobility Exercise Program.
12. OTAGO (2015) Strength & Balance. Falls Prevention Exercise - following the evidence. Home exercise programme. Later life training. Age UK.
13. Camacho PM, Petak SM, Binkley N, et al. (2016) American association of clinical endocrinologists and american college of endocrinology clinical practice guidelines for the diagnosis and treatment of postmenopausal osteoporosis-2016. *Endocr Pract* 22: 1-42.
14. Miller PD, Hattersley G, Riis BJ, et al. (2016) Effect of abaloparatide vs placebo on new vertebral fractures in postmenopausal women with osteoporosis: A randomized clinical trial. *JAMA* 316: 722-733.
15. Robinson Y, Olerud C (2012) Vertebroplasty and kyphoplasty-a systematic review of cement augmentation techniques for osteoporotic vertebral compression fractures compared to standard medical therapy. *Maturitas* 72: 42-49.
16. Beckmann J, Ferguson SJ, Gebauer M, et al. (2006) Femoroplasty-augmentation of the proximal femur with a composite bone cement-feasibility, biomechanical properties and osteosynthesis potential. *Med Eng Phys* 29: 755-764.