

## The Association between Osteoarthritis and Osteoporosis: In Bad Company?

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### Letter to the Editor

Osteoarthritis and osteoporosis are two common musculoskeletal diseases that affecting millions of people with significant morbidity and mortality [1]. Both of them are amongst the greatest reasons of disability in elderly individuals, particularly in postmenopausal women [2]. An overview of recent findings in male osteoporosis, by Willson et al. [3], has proposed that osteoporosis is a prevalent musculoskeletal disorder, resulting from micro architectural deterioration of bone tissue and low bone mineral density, in which there is no sufficient balance between the bone formation and resorption [3]. Therefore, in this condition, the significance of the resorption can increase the risk of bone fragility [4]. Fractures, chronic pain, disability and decreased bone mineral density are major symptoms in osteoporosis [5]. Almost 50% of females and 20% of males over the age of fifty experience this disease [6]. Therefore, the prevalence of osteoporosis is significantly higher in females. In postmenopausal women, when the estrogen levels start to fall, osteoporosis is an important cause of disability [7]. Like osteoporosis, osteoarthritis is a widespread degenerative disease that frequently causes disability in aged population [8]. This disease impacts on all anatomical joint structures [9]. It is characterized by joint pain and stiffness, cartilage degeneration, thickening of subchondral bone, loss of function and reduction in mobility [2,10]. This disease approximately affects 18% of women and 10% of men older than 45 years [11]. Osteoarthritis is divided into the atrophic and osteophytic types. An important symptom in the atrophic type of osteoarthritis is cartilage deterioration without any osteophytes. In contrast, the patients with osteophytic osteoarthritis have a higher bone mineral density, a wider femoral neck, and greater bone strength [12].

For many years, a lot of studies took place in order to find the association between these diseases, and it has been frequently suggested that osteoarthritis and osteoporosis could have a negative relationship [13]. However, both of them not often present together in same patients [9]. Particularly, several works have demonstrated the existence of an inverse association between them in the hip and knee joints [8]. An increase in the level of bone mineral density has been reported as a risk factor for the development of osteoarthritis. Despite of this fact that an elevated amount of body mass could decrease the risk of osteoporosis [14], Hart et al. [13] have reported a small raise in bone mineral density in middle-aged women with osteophyte osteoarthritis. A number of studies by emphasis on this point that osteoporosis is a skeletal disease accentuated an inverse relationship between these two diseases [9]. Furthermore, most of the studies by consideration of three main risk factors for osteoporosis, including physical inactivity, decrease of body weight and oestrogen deficiency, have mentioned a negative relationship with osteoarthritis.

Although an inverse association between osteoarthritis and osteoporosis has been frequently demonstrated in the literature, some studies vindicated their coexistence. Some recent investigations have suggested that osteoarthritis and osteoporosis may coexist, particularly in patients waiting for total hip arthroplasty [12]. Opposite to the general belief, one study has reported that the prevalence of osteoporosis was 20.7 percent in patients waiting for total hip

arthroplasty, as a result of the association of atrophic osteoarthritis with low body mass and osteoporotic fractures [15]. Some other examinations have demonstrated that 25 percent of postmenopausal women scheduled for undergoing total hip arthroplasty had hidden osteoporosis [16]. It has been also shown that osteoporosis could elevate the progression of osteoarthritis in animal models [7]. In fact, osteoporosis is associated with atrophic osteoarthritis. The patients with atrophic osteoarthritis always have low body mass and the higher risk of osteoporosis fractures. The differences between the reports in the literature about the relationship between osteoarthritis and osteoporosis can be due to the lack of consideration osteoarthritis subtypes [12].

One of the most recent developments in the treatment of osteoarthritis is the use of anti-osteoporotic agents. In this concept, bisphosphonates and strontium ran elate are potential therapeutic agents for osteoporosis. A recent clinical trial indicated that these important classes of drugs could significantly reduce knee osteoarthritis pain, improve function and delay the progression of knee osteoarthritis [11]. Although there is enough evidence on the effects of osteoarthritis and osteoporosis on each other, the right answer to this question, whether osteoarthritis and osteoporosis are associated or not, remains still unclear [14]. Therefore, extended research needs to be conducted to fully understand the relationship between these two diseases. In addition, future clinical and *in vivo* studies should systematically assess the various effects of these diseases. Interdisciplinary research and effective collaborations can potentially answer this question in the near future.

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Received April 01, 2015; Accepted May 01, 2015; Published May 08, 2015

Citation: Rahmati M, Mozafari M (2015) The Association between Osteoarthritis and Osteoporosis: In Bad Company? *J Osteopor Phys Act* 3: 134. doi:10.4172/2329-9509.1000134

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