Obesity and Musculoskeletal system

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Musculoskeletal disorders are an important cause of impaired quality of life, disability and lost productivity. Obesity is associated with increased risk of Osteoarthritis of hips, knees and hands, Tendinitis of shoulders, plantar fasciitis and increased fracture risk in children, which together account for a significant proportion of the health costs relating to obesity. Interestingly, increased body weight is associated with increased risk of osteoarthritis in non-weight-bearing joints. This suggests that obesity may lead to changes in cartilage and bone metabolism independently of excess weight-bearing, and collectively are the most expensive disease category for European healthcare .

Obesity has long been associated with osteoarthritis and soft-tissue disorders, but no convincing links have been identified with rheumatoid arthritis or other inflammatory joint diseases. Osteoarthritis is the most common musculoskeletal disorder. Obesity is a well-known risk factor for both the development and progression of osteoarthritis in weight-bearing joints, notably the knees and to a lesser extent the hips. The relative risk of developing osteoarthritis of the knees rises by over 100-fold (from 0.1 to 13.6) as BMI increases from 20 kg/m2 to 36 kg/m2, as compared with the risk at a normal' BMI of 24–24.9 kg/m2 .

Population-based case-control studies indicate that, in men, even a modest rise in BMI within the normal range significantly increases the risk of developing osteoarthritis of the knees. Osteoarthritis of the knees and hips progresses more rapidly in obese subjects, who are more likely to need joint replacement; perhaps surprisingly, however, obesity does not increase the risk of these operations failing and requiring revision. Osteoarthritis of the hands is also more common in obese people, whereas the foot and ankle joints are relatively spared. The association between obesity and osteoarthritis is poorly understood. The classical explanation – excessive mechanical loading of the joints during locomotion – appears valid for the hips and knees osteoarthritis. However, this cannot explain the sparing of weight-bearing joints below the knee, or osteoarthritis of the hands. Recent research points to altered metabolism of cartilage and bone, leading to loss of cartilage and remodelling of damaged bone, with increased density and overgrowth
to form the characteristic osteophytes. These changes may be induced by increased local concentrations of adipokines (leptin and resistin) released by the expanded fat mass, and the concomitant fall in adiponectin.

An increased ratio of leptin to adiponectin in synovial fluid may trigger cartilage destruction and thus contribute to the initiation and/or progression of osteoarthritis. These circulating factors may help to explain the involvement of non-weight-bearing joints, and also how weight loss can protect against both the development and progression of osteoarthritis.

Obesity also increases the risk of developing tendinitis of the shoulder, causing a ‘painful arc syndrome’ and plantar fasciitis. Heel pain may also arise from reduced elasticity of the underlying fat pad, increasing the force transmitted to the heel. Overall, subjects with a BMI 30 kg/m2 have a fourfold increased risk of developing musculoskeletal pain involving the back, hip, knee, ankle and foot.

The risk of bone fracture following trauma is altered by obesity, with opposite effects in children and adults. Obese children are at increased risk of fractures, possibly because bone mineral density is lower as a result of reduced physical activity and poor nutrition. By contrast, obesity may protect against fractures in older adults. A recent meta-analysis found a 17% reduction in the risk of hip fractures in men and women with a mean age of 63 years whose BMI was 30 kg/m2, as compared with subjects with a BMI of 25 kg/m2. Suggested mechanisms include the enhanced bone density of the femora head and neck, which has been demonstrated in White women, as well as greater cushioning by the overlying fat layer.