

Osteoporosis

Osteoporosis is a Phenomenon of aging. It is a process where osteoclasts outperform osteoblasts, creating a situation where more bone is lost than gained. Over time the bones become weaker as osteoclasts deplete bone faster than osteoblasts can remodel and rebuild them.

By age 60, 1 of 10 people have some osteoporosis. By age 74, perhaps 2 of 10. If you live into your 90s, you have a 70% likely hood of osteoporosis. (Gupta et al., 2019) Some people are more genetically predisposed to osteoporosis. This does not mean they are predisposed to dangerous fractures. Less than 30% of osteoporotic fractures are due to genetics.(Michaelsson et al., 2005)

The problem is that bones become more likely to fracture as people age from an assortment of factors. If we can control some of the factors, we may make a big difference in the likelihood of a fracture. Fracture rates vary from country to country causing us to consider life style factors. One third of hip fractures occur in men, so it is worthwhile to avoid stereotypes and instead identify risk factors that may make a real difference in reducing hip fractures.(Kanis et al., 2012)

Some medications that increase damage to bones

It has become common to address digestive issues with proton pump inhibitors. PPIs (proton Pump inhibitors) such as Prilosec, Prevacid, Nexium, Protonix are available OTC. Some are prescription only. A 2006 study indicated these were associated with increased hip fracture as well as spine fracture. (Luo et al., 2018) More recent studies have backed up these findings. These drugs are not approved for extended use.(Poly et al., 2019) However many people take them for the wrong reason and over extended time periods. They are taken for H. Pylori, GERD, heartburn and ulcers. It is likely that 60% of PPI use is misguided. Other issues related to PPI use include kidney disease, C.diff infection, cancer and CVD.(Safer, 2019) People find many reasons to use PPIs, but often cannot get off of them timely.

Some drugs offered to stop osteopenia cause it to occur. It turns out that BPs (bisphosphonates) are slightly helpful in preventing vertebral fractures, but not hip fractures.(Wu et al., 2020) Hip fractures are the most damaging. If a patient has had a previous hip fracture, bisphosphonates can reduce risk 25% for another fracture, but does not reduce risk for an initial hip fracture.(Abbasi, 2018)

Bisphosphonates have some rare, but serious side effects. Jaw bones have been damaged and femurs have snapped without cause. The longer BPs are taken the worse the ratio of snapped

bones to prevented fractures. (Lems and Raterman, 2017) The use of these drugs is an individual decision for each client to be make with their doctor after evaluating the data and risk.(Abbasi, 2018)

The above information partially explains why we have high hip fracture rates in the US. Clearly, there is more to it than genetics or aging. Are there dietary interventions?

Does Calcium help or harm?

Relying on Calcium to save bone health is tricky business. (Nestle and Nesheim, 2013) The 1992 study that led to the idea all women need Ca and D to prevent hip fracture was flawed in that the study group was all female and all institutionalized. They did not leave the housing environment and were therefor in safe surroundings.(Chapuy et al., 1992) A reanalysis of the study found that women who had not taken calcium supplements prior to the study experienced a higher rate of cardiovascular events than those in the control group not taking any calcium supplement. (Bolland et al., 2011) The risk – benefit analysis for taking calcium supplements indicates that treating 1000 people with Calcium supplements would prevent 26 fractures but cause an additional 14 myocardial infarctions, 10 strokes, and 13 deaths.(Reid, 2013) The current USPSTF recommendation for postmenopausal women is “do not supplement”.(Nestle and Nesheim, 2013)

The latest data suggests Ca balance is handled by the body with all excess being excreted or possibly absorbed in places we would rather not store it such as arterial walls. Calcium supplements may offer some benefit for older people, people with gastric bypass, or people with absorption diseases who cannot get sufficient calcium from their diet. A supplement of 500 mg /day of Calcium along with vitamin D and K can help counter absorption issues and is appropriate for older individuals. Research continues looking at the value of supplementing vitamins K and D to preventing excess supplemental calcium from being absorbed into the arterial walls. It is not clear if the risk is mitigated. Mega doses of these are considered harmful. It has become clear that taking daily doses of calcium as a supplement does not produce the same result as calcium from food and is possibly harmful.(Morelli et al., 2020) A minimum of 500mg of dietary Calcium daily from food is necessary and is absorbed safely and more thoroughly than supplemental Calcium.

Vitamin D

Vitamin D has also been evaluated relative to fracture prevention and is beneficial to preserving muscle strength and thereby preventing fracture.(Wicherts et al., 2007) Although researchers are uncertain of the mechanism that vitamin D supports, in many tests there is clear evidence that it improves muscle strength, especially in the quads which would help prevent falls and hence fractures (Beaudart et al., 2014) There may also be a neurological component influenced

by vitamin D. It was found that people who stopped walking when talking were 80% more likely to have a fall in the following 6 months. Low Vitamin D status was associated. (Marcelli et al., 2015) The US Preventive Services task Force and the American Geriatric Society recommended vitamin D supplementation for persons who are at high risk for falls.(LeBlanc and Chou, 2015). Recommended average daily intake of vitamin D from all sources for older adults should be >1000 but <4000IU. Mega doses are not recommended and even lead to bone loss and more falls.(Burt et al., 2019)

What about Milk? Yes, there is calcium, but there are problems with milk sugar. Galactose has been found to weaken bones and leads to aging.(Michaelsson et al., 2014) Drinking milk does not prevent hip fracture in adults. Milk consumption during teenage years was not associated with a lower risk of hip fracture in later years. Surprisingly there was a 9% increase in risk in men for each additional glass of milk consumed daily as children. (Bischoff-Ferrari et al., 2011) Recent data suggests that more dairy leads to shorter lives and that hip fractures are highest in populations with the greatest milk consumption. Milk situation has been reviewed by the largest study ever in 2019 and confirms whole milk intake is significantly associated with higher risk of total mortality. (Ding et al., 2019). Sour milk and yogurt may be helpful as the milk sugar is fermented away.(Michaelsson et al., 2014) Fortified plant based milk beverages can be helpful by providing calcium along with vitamin D in an absorbable matrix and without harmful galactose.

Which foods are helpful?

As we age our system becomes more acidic due to renal insufficiency, reduced conservation of bicarbonate and decreased excretion of acid. (Frassetto and Sebastian, 1996) The most acid forming foods are meat and cheese. Diet induced metabolic acidosis can be countered by a diet high in fruits and vegetables which are alkaline foods. For bone health, alkaline foods are the best choices. A diet that is anti-inflammatory reduces acidity.(Cao et al., 2018) A diet high in fruits and vegetables is alkaline rather than acid. The best from this group include: (in descending order) onion, arugula, prune, fennel, orange, leek, garlic, red cabbage, celery, red wine, French beans, broccoli, tomato, Chinese cabbage, and cucumbers. The champs in this group are the allium family: onions, garlic, sulforaphane, and lycopene. Why onions? Onions are rich in quercetin, a flavonoid that decreases osteoclastic activity. (Wattel et al., 2004) Lycopene (tomato) also inhibits osteoclastic activity.(Rao et al., 2003) Vitamin C rich foods are also helpful in reducing hip fracture.(Zeng et al., 2019) When we select our food we should select foods that feed our cells (not our stomachs) at least 90% of the time. Occasionally we may select a less desirable food (that may please our stomach and palate) but not our cells. Ideally we will train the palate to enjoy foods that support health and these foods will become the foods that please us from stomach to cell.

Exercise

Weight bearing exercise of moderate intensity yields an effective bone modeling signal response to pressure.(Troy et al., 2018). The true value of bone building exercise depends upon intensity. The most helpful exercise protocols combine high intensity resistance and impact. Moderate intensity and moderate impact provided less support for bone. Low intensity exercise protocols did not support bone health. Non-impact exercises such as cycling or swimming did not have an effect on bone density.(Kistler-Fischbacher et al., 2021) Use weighted vest, jogging and stair stepping for variety. People with severe osteoporosis or a recent history of fracture or pain from osteoarthritis should check with their doctor before implementing a weight bearing program. Athletes in non-weight bearing sports should include cross training that includes weight bearing exercise.

To reduce risk of fracture use regular balance and functional exercise to improve balance and strengthen bones. With or without vitamin D exercise has prevented falls and thus fractures. (Uusi-Rasi et al., 2015) Balance and functional exercise reduce falls by 24% and hence reduce fractures. (Dautzenberg et al., 2021) The best strategy to reduce fracture in the elderly may be to utilize exercise to reduce risk of falling rather than searching for pharmaceutical ways to increase bone density.

Stop smoking.

Eat well.

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