



Osteoporosis prevention – top tips from the Dove Clinic

This month is National Osteoporosis awareness month, here Dr Richard Fuller explains about osteoporosis and why there is more to bone health than calcium...

Your body contains over 200 bones making up the remarkable living scaffolding of our skeleton. Our bones, when healthy, have a similar tensile strength to cast iron but are just a third of its weight! These remarkable properties are thanks to a combination of flexible collagen fibres and hard mineral crystals, mainly calcium and phosphate which are arranged in highly organised patterns to maximise strength. But our bones are far from inert and static structures. They are constantly remodelling and turning over by breaking down old bone and reforming new bone. If the balance of

bone production and breakdown is left in a negative balance over sustained periods we become vulnerable to bone thinning – osteoporosis.

It is estimated that a 10% loss of bone mass in the hip can result in a 2.5 times greater risk of hip fracture. This is a silent process which is easy to ignore when charging around in our hectic lives, but the diet and exercise patterns we keep may make the difference to staying healthy or suffering the consequences of broken scaffolding later in life! The current medical recommendation remains calcium and a relatively low level of vitamin D supplementation for those at-risk, such as post-menopausal women, and a group of medicines called bisphosphonates to slow bone turnover for those with proven osteoporosis and related fractures.

Yet despite current strategies osteoporosis is increasing rapidly and affects over 2 million people in the UK. Between 1990 and 2000, there was nearly a 25% increase in hip fractures worldwide. It is a widely held opinion that osteoporosis is an inevitable part of ageing, but the pattern of osteoporosis around the world tells a different story. For us in the developed West, the bad news is that we are affected more than anywhere else. One way to look at the effects of bone thinning is by comparing national rates of broken bones and in particular the rates of hip fractures in people over 50 years old. The lowest levels are found in countries such as Nigeria, China and Thailand, and somewhat against intuition the highest levels (nearly 200 times higher!) are seen in countries with higher calcium, but also higher dairy and meat intake such as USA, Australia, Norway and Germany. So, what can we learn from this?

Acid-Alkali balance

It seems a good opportunity to mention a relatively undiscussed area of research into the effect of diet and nutrition on osteoporosis. This relates to acid-alkali balance and the way we interact with our food. For most of us the term acid-alkali balance conjures up distant memories of chemistry at school, that scary bottle of hydrochloric acid, the bicarbonate of soda and chalk as alkali-substances, and something about litmus paper?! Acids like to donate a hydrogen ion and alkali-substances donate a hydroxide ion, in combination these two opposites neutralise each other. The strength of their properties are measured on the pH scale from 0 (very acidic) to 14 (very alkali) with 7 as a neutral point.

All living organisms need balance, and our blood is kept under a very tight control between pH 7.3 to 7.4 which is slightly alkali. If blood ventures outside this fine balance then serious and life-threatening changes occur to key proteins, enzymes and metabolic processes. It is now well understood that the foods we eat have either acid-forming or alkali-forming properties which is measured according to its

Potential Renal Acid Load (PRAL). The total acid or alkali load that our body processes varies widely according to our dietary intake. Somewhat against intuition many studies have confirmed that foods which we might assume from their taste or texture would be alkali such as meat, wheat flour, hard cheese and dairy products actually have a net acid-forming effect within the body. Conversely, herbs and spices, vegetables, most fresh and dried fruit, even acidic-tasting lemons and citrus fruit break down to form alkali-compounds within the body.

If dietary balance is not achieved then we have to compensate using other mechanisms, the main pathways involving our kidneys and our bones, the latter being our largest pool of alkali minerals which may be used to mop up excess acid. The western diet has shifted significantly towards acid-forming foods. Increasing consumption of flour and grains, phosphorus containing fizzy drinks and affordable meat supplies all contribute. Many studies have confirmed the correlation between osteoporosis and high animal versus vegetable protein intake. Though it remains controversial, the hard cheese that we eat thinking of its beneficial calcium level actually has a PRAL level 3 times as acidic as most meats and may not be as good for bone health as is currently believed.

It would not be possible, nor would it be in balance to eat a diet which contained exclusively alkali-forming foods, though ensuring a balance of 60:40 of alkali to acid forming components in our daily intake would go a long way maintaining general and skeletal health. A wide variety of alkali forming supplements could also be considered beneficial to supporting balance. Feel free to email me on richard.fuller@doveclinic.com for a more comprehensive food list.

Other tips:

- Calcium – avoiding deficiency is vital, though most diets provide sufficient levels. Good non-dairy sources of calcium include nuts – especially brazil, hazel and walnuts, olives, kiwis, raspberries, oranges, egg yolks, oregano, parsley and cinnamon.
- Vitamin D3 – low levels are associated with osteoporosis. Vitamin D has an essential role in calcium absorption and metabolism. Deficiency is extremely common in UK particularly during winter. Current supplements that are prescribed for osteoporosis typically contain 400 IU though further benefit to immune function and non-skeletal benefits often require larger doses. A recent review in the BMJ concluded a larger daily dose of Vitamin D3 helped to prevent falls in the elderly which is another way to try and reduce hip fractures. Consider 1000-2000 IU per day and monitor blood levels to make sure you are in the right range.
- Magnesium – the third most common mineral in bone. Deficiency and low intake is relatively common, especially in young females. Good dietary sources include green vegetables, nuts and legumes and hard drinking water. Consider checking levels and supplementation if required.
- Don't - consume excess alcohol, salt, caffeine or smoke. Do – exercise regularly, walking and weight bearing activity increases bone strength.

Dr Richard Fuller
June 2011