

Further food facts and bones – looking beyond calcium and vitamin D

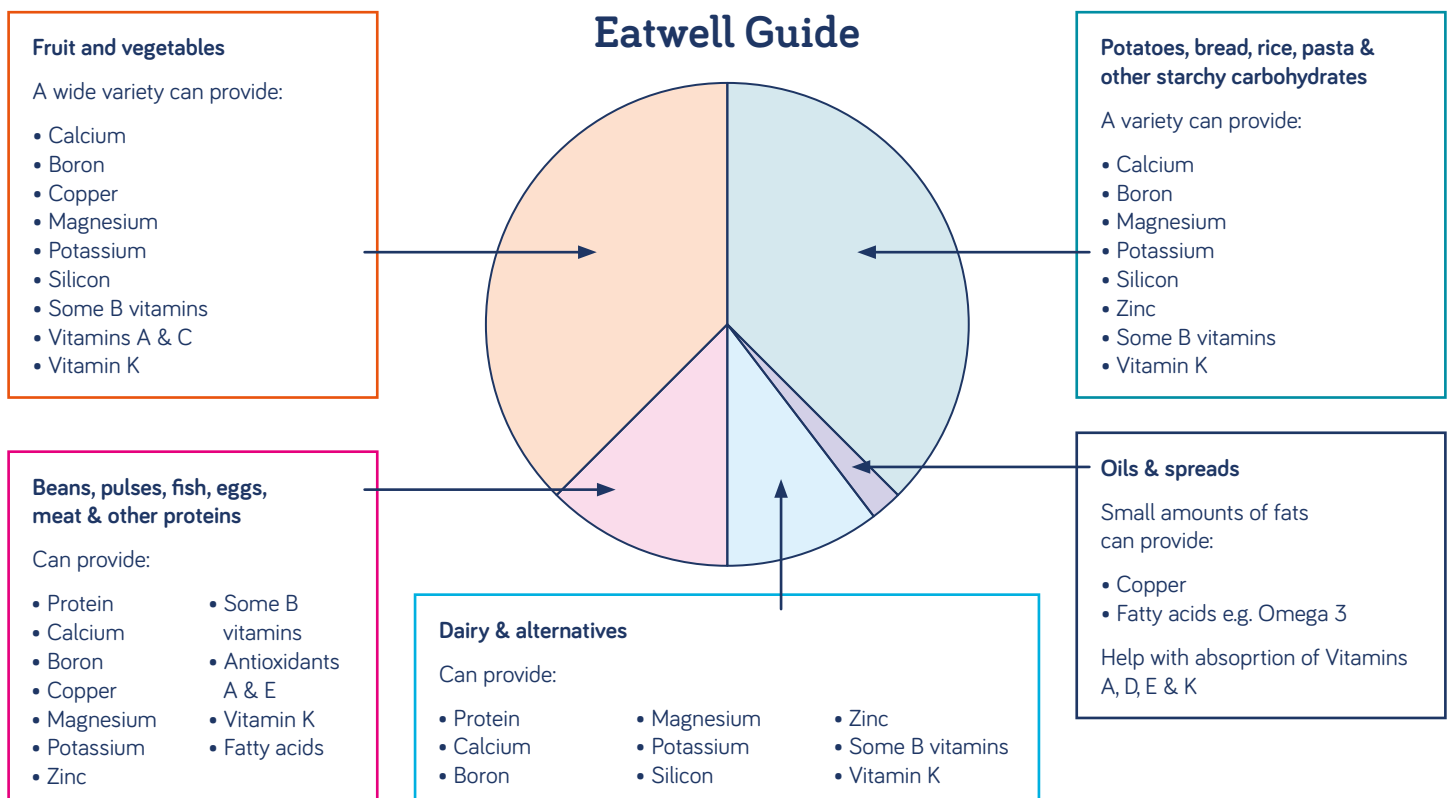
What is osteoporosis?

Osteoporosis occurs when the struts that form the mesh-like structure inside bones become thin. This causes the bone to become fragile and break easily, even after a minor bump or fall. You might hear these breaks described as ‘fragility fractures’. The terms ‘fracture’ and ‘broken bone’ mean the same thing.

Fractures can occur in many parts of the body, but they are most common in the wrists, hips and spine. It’s these broken bones that can cause pain, rather than osteoporosis itself. Spinal fractures can also cause height loss and a curved spine.

Most people know that calcium and vitamin D are essential for our bones, but these alone cannot keep them healthy and strong. Other nutrients are also needed. A healthy, mixed and well-balanced diet contains the variety of minerals and vitamins, proteins and other nutrients that our bones need. The ‘Eatwell Guide’ below shows the proportions of different food groups that make up well-balanced healthy eating. The range of nutrients typically obtained from these groups is also shown.

A more detailed picture and explanation of the Eatwell Guide is in our members’ booklet, ‘**All about osteoporosis and bone health**’. This, and the central message on healthy eating for strong bones, is in Section 2 of the booklet and is also on our website. This fact sheet answers common questions about the role of specific nutrients in bone health and explains how to get these through healthy eating.



Minerals and bone health

Apart from calcium, which minerals are needed for bone health?

Our bones need a range of minerals, such as boron, copper, magnesium and potassium (see below for these and other necessary minerals). Most of these are 'trace minerals' which are needed only in small amounts. For most people, all minerals should be readily available through a balanced diet without the need for dietary supplements (see the Eatwell Guide on page 1).

Boron

Boron may affect the way minerals are used in the body and reduce mineral loss in urine. There are only a few studies on the role of boron on human bone health so more research is needed to confirm this. A balanced diet rich in fruits and vegetables should provide all the boron you need.

Examples of boron-containing foods: green vegetables, avocados, potatoes, fruit, dried foods, nuts, eggs, milk and wine.

Copper*

Copper appears to have an effect on the formation and mineralisation of bone and collagen (the protein mesh in bone to which minerals are attached). Study results are variable on the benefits of copper but not getting enough may reduce bone strength. Copper is an essential nutrient in our diet but high levels can be toxic to the liver and kidneys. A balanced diet should provide the right amount.

Examples of copper-containing foods: nuts, seeds, fruit, beans, sunflower oil, mushrooms and shellfish.

Magnesium

What are the benefits of magnesium for my bones?

Magnesium helps with calcium and vitamin D metabolism, mineralisation of bones, reducing bone loss, and helping nerves and muscles to work properly. A magnesium deficiency may be a risk factor for osteoporosis, but it's not clear to what extent low magnesium levels contribute to the risk of fractures in older age. Currently, having blood tests to measure magnesium levels, or routinely taking magnesium supplements, have not been proven to be useful or beneficial.

Examples of magnesium-containing foods: green vegetables, milk, dairy foods, tap water (hard water more than soft), nuts, brown rice, fish, meat, bread (especially wholegrain), breakfast cereals, bananas and orange juice – in fact, many commonly-eaten foods from each of the four main food groups, many of which contain calcium as well.

Should I take a magnesium supplement?

Some websites suggest taking a magnesium supplement to achieve a specific ratio of calcium to magnesium. It's not clear how essential this ratio is, but a healthy, balanced, calcium-rich diet is likely to provide sufficient amounts of both magnesium and calcium in a natural balance without the need for a magnesium supplement. Magnesium supplements can cause diarrhoea, and if you have other medical problems, such as kidney or heart conditions it would be best to check with your GP first. So for most people, obtaining the magnesium you need from a healthy, balanced diet is the best option.

Potassium

Potassium has an alkaline influence on the diet (see the section below on 'An acidic diet') and can reduce the loss of calcium in urine. Potassium is in so many foods that it should be easy to obtain what your body needs through a varied and balanced diet.

Examples of potassium-containing foods: bananas, fruit, orange juice, vegetables, potatoes, coffee, nuts and seeds, pulses, fish and shellfish, meat (beef, chicken and turkey) and milk.

Silicon

Appears to play a role in keeping bones mineralised and connective tissue (such as collagen) healthy. A deficiency in humans has never been found.

Examples of silicon-containing foods: cereals, rice, water, beer, bananas, many fruits and vegetables.

Zinc*

Zinc is involved with bone building, mineralisation and growth. A zinc deficiency may occur in elderly people who have a limited range of foods in their diet and are malnourished.

Examples of zinc-containing foods: eggs, dairy foods e.g. cheese and yoghurts, red meat, shellfish, bread, cereals, Brazil nuts and pecans.

Some studies have shown that high intakes of copper and zinc using supplements may increase bone loss and having too much of one can affect the work of the other. You can get the right amounts of copper and zinc by having a healthy, varied and balanced diet (see the Eatwell Guide on page 1).

Vitamins and bone health

Apart from vitamin D, are there other vitamins needed for bone health?

Vitamin K

What are the benefits of vitamin K for my bones?

Vitamin K 'turns on' a protein called osteocalcin which is necessary for bone building and bone healing. Some studies have shown that people with low intakes of vitamin K have lower bone density and a higher risk of fractures, although results have been varied and inconsistent. Vitamin K deficiency is usually a consequence of a medical condition which affects the absorption of food such as Crohn's or coeliac disease or severe liver disease.

Which foods contain vitamin K?

Vitamin K is present in commonly-eaten foods and is easily absorbed. There are different forms of vitamin K, with vitamins K1 and K2 being the main ones. Vitamin K1 is obtained mainly from plant sources, and vitamin K2 is produced from some animal products and through the action of naturally-occurring bacteria present in the gut. These gut bacteria are involved in helping the body produce, break down, convert and absorb different types vitamin K.

Vitamin K1: is found in green leafy vegetables, broccoli, spinach, cauliflower, asparagus, okra, parsley, fruit, cereals and vegetable oils. Smaller amounts are in meat, eggs, dairy and cheese.

Vitamin K2: most is provided by the bacterial flora of the gut. It's also found in fish, meat, liver and eggs, soy foods and some fermented dairy, such as cottage, ricotta, brie and Gouda cheeses, yoghurt and Kefir (fermented milk). In general the UK diet is not rich in vitamin K2. Japanese diets contain higher amounts largely due to 'Natto' (a Japanese dish of fermented soya beans).

Should I take a vitamin K supplement?

Evidence on the effects of vitamin K supplements on bone health and strength isn't strong, so currently supplements are not recommended. Studies have shown that a diet rich in vitamin K foods is linked to lower risks of hip fractures in older people, however taking vitamin K1 or K2 supplements did not always result in improved bone strength.

I've read that vitamin K2 supplements may have a beneficial effect linked to taking calcium supplements. Is this true?

It's been suggested that vitamin K2 may play a part in keeping blood vessels healthy and help to

prevent calcium build-up in arteries. So far, the studies on this are inconclusive so at the moment vitamin K2 as a supplement isn't recommended.

Is there anything else I should know about vitamin K?

Vitamin K also has a role in blood clotting and so foods that contain high amounts of vitamin K, such as liver and broccoli, can affect the action of anticoagulant (blood thinning) medications such as warfarin, and make them less efficient. Don't leave out these foods if you are taking an anticoagulant, just make sure that you have a regular and constant amount. This will help to ensure that vitamin K levels in the bloodstream are fairly constant and your blood will clot normally. If you are taking warfarin, you shouldn't take a vitamin K supplement or make any major changes to your diet without discussing it first with your GP.

B Vitamins

What are the benefits of B vitamins for my bones?

There are several B vitamins. Some of these appear to be beneficial to bones and may help prevent fractures, in particular vitamins B6 (pyridoxine), B9 (folic acid) and B12 (cyanocobalamin). The B vitamins are important as contributors to different functions in the body, and vitamin B12 is important for helping bone building cells (osteoblasts) to work.

Vitamins B9 and B12 also help to keep levels of homocysteine (a breakdown product of protein) within a normal range in the body. Homocysteine levels can increase with age, with vitamin B deficiency, and in people who smoke or have a high protein diet with a low intake of fruit and vegetables. A high level of homocysteine has been linked to an increased risk of fractures in older people.

Which foods contain vitamins B6, B9 and B12?

Processed foods tend to be lower in B vitamins than non-processed foods.

B6: is found in pork, poultry, liver, fish, bread, whole cereals e.g. oatmeal & wheat germ, brown rice, eggs, vegetables, beans, soya beans, peanuts, milk, potatoes, some fortified breakfast cereals

B9: is found in green leafy vegetables, broccoli, brussel sprouts, spinach, asparagus, peas, chickpeas, liver, wholegrain bread, brown rice, nuts, oranges, bananas, fortified breakfast cereals.

B12: is found in beef, lamb, liver, shellfish, salmon, cod, cheese, milk and eggs. Vegan sources are fewer but include some fortified breakfast cereals, some fortified soya drinks & yeast extracts e.g. Marmite.

Antioxidant vitamins C and E

What are the benefits of these vitamins for my bones?

Current interest in antioxidants is around their ability to protect cells from damage caused by 'free radicals'. Free radicals are unstable molecules produced when food is digested and combined with oxygen to produce energy. A build-up of free radicals in the body may contribute to loss of bone strength. Ensuring an adequate intake of foods containing antioxidant vitamins can help to neutralise the effects of free radicals. Vitamin C is also necessary for the formation of collagen, which is the protein mesh in bone to which minerals are attached. Scurvy is a condition that can develop when the body doesn't have enough vitamin C to produce new collagen.

Which foods contain vitamins C and E?

Vitamin C: is found in a wide variety of fruit and vegetables. Good sources are oranges, orange juice, red and green peppers, strawberries, blackcurrants, broccoli, brussel sprouts and potatoes.

Vitamin E: a deficiency is rare. It's available from commonly eaten foods e.g. vegetable oils (soya, corn and olive oils), nuts, seeds and cereals.

Other nutrients and bone health

Protein

Is protein good for my bones?

Protein is essential for bone health and collagen structure (the protein mesh in bone to which minerals are attached) and needs to be part of a balanced diet. In general, Western diets provide more than enough protein. However our need for protein increases with age, and elderly and frail people are at risk of not having enough in their diets if, for example, appetite is poor or if there are physical or practical problems with shopping and cooking food. This can contribute to bone loss, muscle weakness, an increased risk of falls and delayed healing of injuries and fractures. Adults and children should consume two to three servings of protein every day as part of a mixed, balanced diet.

Which foods contain protein?

These include meat, fish, eggs and dairy e.g. milk, cheese and yoghurt, including low-fat versions. Good plant sources of protein (suitable for vegetarians and vegans) include nuts, seeds, pulses, baked beans, soya products, cereals and dairy alternatives (such as soya and almond milk products).

Protein is made up of different amino acids, each with their own beneficial effects. Animal sources of protein (such as meat, fish and dairy) contain the

full range of essential amino acids that adults need for good bone and general health. However, there's only a limited range of amino acids in individual plant foods. Therefore if you are vegan or vegetarian or your protein intake is mostly from plant foods, it's important to include a variety of plant foods in your diet so that the different amino acids in these foods complement each other and maximise the nutrient value of your diet.

Fatty acids

Are there any benefits of fatty acids for my bones?

During digestion the body breaks down fats in our food into smaller units called fatty acids which can then be absorbed into the bloodstream. Omega-3 and Omega-6 (polyunsaturated fatty acids) appear to have a beneficial role in bone health. A small amount of fat is an important part of a healthy, balanced diet and helps absorb fat-soluble vitamins A, D, E and K.

Which foods contain omega-3 and omega-6?

Omega-3: good amounts are in oily fish e.g. mackerel, kippers, herring, trout, sardines, salmon and some shellfish such as mussels, oysters and crab, and also omega-3 enriched eggs. Aim for two portions of fish a week, at least one of which should be an oily fish. However, it's important that pregnant or breastfeeding women and women who are trying to get pregnant should have no more than two portions of oily fish a week because of the levels of pollutants that some fish contain.

Plant sources of omega-3 are found in walnuts, flaxseed (linseed) oil, rapeseed oil and soya-based foods e.g. tofu. If you do not eat oily fish you may be having less omega-3 than your body needs. However, plant sources of omega-3 are converted in the body into the types found in oily fish so they play an important part in supplying some of the omega-3 you need.

Omega-6: most people get enough omega-6 from polyunsaturated vegetable cooking oil e.g. sunflower, corn and sesame oil. Also in eggs, turkey, some nuts and evening primrose oil supplements.

Phyto-oestrogens (Isoflavones)

Are there any benefits of phyto-oestrogens for my bones?

Phyto-oestrogens, such as isoflavones, are plant substances that act like weak forms of oestrogen, the female hormone in the human body. They have some oestrogen and anti-oestrogen effects and are sometimes taken to improve menopausal symptoms, such as hot flushes.

Several studies have checked if phyto-oestrogens provide bone health benefits, but unfortunately there has been either no effect or at best a very weak effect on levels of bone density even when high intakes of phyto-oestrogens were taken - higher than is normally present in a Western diet. More importantly, research has not found that phyto-oestrogens reduce the risk of fragility fractures (bones which break too easily).

Which foods contain phyto-oestrogens?

Foods made from soya and linseed (flax) e.g. tofu, soya milk, and soya and linseed bread ('Lady's Loaf').

Chinese, Japanese and oriental diets contain significantly more phyto-oestrogen foods than a Western diet.

Should I increase my intake of phyto-oestrogen food?

Currently there is not enough evidence to recommend an increased intake of phyto-oestrogens to reduce bone loss or to strengthen bones.

Are there any foods or drinks which are bad for bone health that I should avoid?

No! As long as they are taken in moderation as part of a balanced diet, there are no foods or drinks which are 'bad for bones' or that you need to avoid. The following foods and nutrients may have some effect on bones that could potentially reduce their strength if taken in excess. Some should be consumed only in limited amounts; others are very unlikely to cause any effect at all. Often the 'bad for bones' label is inappropriate or inaccurate.

Vitamin A

Vitamin A is essential for good general health and should be taken as part of a healthy, balanced diet. However, it's important to avoid having excessive amounts of one form of vitamin A, called pre-formed retinol. Some studies (mainly from Scandinavian countries which tend to have higher intakes of vitamin A in their diet) have shown a link between high intakes of pre-formed retinol and lower bone density and increased risk of hip and other fractures later in life. This may have implications for older people and those at risk of osteoporosis.

Which foods contain vitamin A?

There are 2 main types of vitamin A: pre-formed retinol and beta carotene. Both are an essential part of our diet.

Pre-formed retinol: comes from animal products. Liver and fish liver oils contain high amounts. It is present in smaller amounts in oily fish and dairy foods e.g. milk, cheese, yoghurts, fortified low fat spreads, eggs.

Beta carotene: is found in highly coloured vegetables e.g. carrots, sweet potatoes, red peppers, spinach, curly kale, apricots, mangos, papayas.

How can I avoid having too much pre-formed retinol?

If you are at risk of osteoporosis it would be sensible to avoid having liver and liver products such as liver pâté more than once a week (or maybe consider having smaller portions). If you eat liver every week, avoid taking supplements containing vitamin A e.g. cod liver oil or some multi-vitamins. Otherwise, having 1.5mg (1500 micrograms) a day, or less, of vitamin A from supplements is unlikely to cause any harm.

Having large amounts of retinol can also harm an unborn baby. Therefore, if you are pregnant or thinking about having a baby, do not eat liver or liver products, such as pâté as they contain high amounts of pre-formed retinol.

But remember, vitamin A is essential for general health and needs to be taken as part of a balanced diet. There is no evidence that having a high intake of foods containing beta carotene is harmful to bones so these do not need to be limited. However as a precautionary measure it may be best to avoid having excessive amounts of foods containing pre-formed retinol.

Fats

We are all advised to avoid having too much fat in our diet. Is fat also bad for bones?

Some fat in our food is important for bone health, but a diet high in fat, and especially high in saturated fats, has been linked to less muscle and reduced bone strength leading to increased fracture risk. For some, having a lot of high fat foods may also be a reflection that they have an unbalanced, nutritionally poor diet and so bones and muscles are not getting the nutrients they need to keep healthy and strong. It's also possible that calcium absorption is reduced as fat can bind to calcium in the gut. However, when fat is part of a healthy, balanced diet it's not considered to have an effect on calcium absorption.

Fizzy drinks

Are fizzy drinks bad for my bones?

No, not directly. Sugary fizzy drinks contain no useful nutrients, so it's important to make sure

they don't replace nutritious food and drinks such as milk, as this may be detrimental to bone health.

Fizzy drinks which contain phosphorus in the form of phosphoric acid, such as cola drinks, may be detrimental if taken in excess. Our body needs some phosphorus for proper bone formation but it needs to be taken in balance with calcium.

If your phosphorus intake is high, this has been found to contribute to bone loss over time, especially when calcium intake is low, although it is not clear that it makes bones more prone to fractures.

The 'fizz' in drinks is not necessarily bad for bones, however. Carbon dioxide is added to give bottled drinks their fizz and although this turns into carbonic acid, this is a very mild type of acid and there's no evidence that it increases acidity in the body or that it harms bones (see the section below headed 'An acidic diet' and the section 'Can foods cause acidity in the bloodstream?').

So carbonated (fizzy) bottled water taken in moderation does not need to be avoided.

Should I stop drinking cola?

Phosphoric acid is added to cola to enhance the flavour, although the amount added is usually small. A high cola intake may cause bone loss through having increased amounts of phosphoric acid, or it may reflect an unhealthy diet which lacks the necessary range of nutrients to keep bones healthy. However, even when taken with a healthy, balanced diet, it would be sensible to limit how much you drink, although an occasional cola drink is probably fine.

Salt

Does salt have any effects on my bones?

Ordinary table salt contains sodium chloride. We need sodium in our diets to maintain water balance in the body, for blood pressure and also for muscle and nerve activity. However, a high intake of salt may cause health problems, such as high blood pressure, and it's possible that it may cause an increased loss of calcium in the urine.

It's not clear if, over time, an increased loss of calcium in urine leads to loss of bone strength or makes bones more prone to fractures, especially if it's adequately replaced by calcium from food and drink. However it would make sense to reduce salt intake in line with Department of Health guidelines.

How much salt is considered safe to have?

Adults should have no more than 6 grams (1 teaspoon) of salt a day (equivalent to 2.4 grams of sodium). Most adults exceed this.

How can I reduce my salt intake?

Around 75% of our salt is hidden in everyday bought foods, e.g. bread, breakfast cereals, cured meats (ham and bacon etc.), stock cubes, ready meals and processed foods.

Check food labels and choose foods containing low to medium amounts of salt (usually colour coded green and amber). A high salt level (colour coded red) is more than 1.5g of salt per 100g (equivalent to 0.6g or more of sodium). Reduce how often you have high salt foods such as bacon and use reduced salt versions of stock cubes and soy sauce. Reduce how much salt you add to cooking and try black pepper or fresh herbs as a seasoning instead. Your tastebuds will soon get used to eating less salt.

Phytates and oxalates

Do phytates and oxalates have any effects on my bones?

Phytates and oxalates are substances present in a wide range of plant foods. They do not harm bones but they have the potential to bind to calcium and other minerals when present in the gut at the same time. Phytates and most oxalates pass through the gut unabsorbed, so any calcium bound to them also passes through the gut without being absorbed.

Do phytates and oxalates prevent all calcium absorption?

No. However, the amount of phytates and oxalates in a food will affect the amount of calcium that is bound to them and cannot be absorbed. Phytates and oxalates are found in a wide range of foods, but most contain only small amounts and so only bind to small amounts of calcium. Therefore they usually have only a small effect on calcium absorption if a calcium-rich diet is taken. Also, calcium taken at other times of the day is not affected.

Which foods contain phytates and oxalates?

Phytates (phytic acid): present in all plant foods but in varying amounts, also bran, nuts, wholegrain cereals, dried beans, seeds and grains.

Oxalates (oxalic acid): present in a large number of plant foods and in tea. The amounts vary but most contain only small amounts. However, a few foods such as rhubarb and spinach contain high levels of oxalates, and even if they contain calcium these particular foods will not provide much calcium for the body to absorb.

Should I eliminate these foods from my diet?

No, because these foods contain valuable nutrients. Instead, limit their effects on calcium absorption by having a calcium-rich diet.

Can soaking food remove phytates?

This is not recommended as it's not known how effective soaking is in reducing phytate levels. Valuable nutrients may also leech out into the water and are lost while foods are soaking.

Caffeine

Does caffeine have any effects on my bones?

A high caffeine intake has been found to increase the amount of calcium lost in urine and in theory this may lead to loss of bone strength if enough calcium is not taken to replace it.

Ground coffee contains more caffeine than instant coffee, and cola drinks also contain caffeine. Although tea contains some caffeine it does not appear to have this effect on bones, maybe because it contains other substances such as flavonoids which might be slightly beneficial to bones and so counteract the effects of the caffeine. It's not clear if a high intake of caffeine from cola is a problem, although there are other health reasons why limiting your intake would be recommended.

So should I stop drinking coffee?

No. The effect of caffeine in coffee is only modest and may cause only a slight imbalance between calcium intake and calcium loss from the body. However if your calcium intake is low or you already have other risk factors for osteoporosis, consider having no more than 4 cups of coffee a day, and bear in mind that strong coffee contains more caffeine. If you like drinking coffee try to balance out any calcium losses by having milky coffee or increasing your calcium intake.

Alcohol

Does alcohol have any effects on my bones?

Drinking excessive amounts of alcohol appears to be a significant risk factor for osteoporosis and fractures. Alcohol appears to slow down the bone renewal process, can slow down healing after a fracture and can also cause unsteadiness leading to falls and fractures (broken bones).

Should I stop drinking alcohol?

No, you don't need to stop, but you should not exceed the government's recommended limit which says that men and women should not drink more than 14 units of alcohol in a week, and to spread these units over the course of at least 3 to 4 days and have some alcohol-free days.

For more information see Sections 2 and 4 of our members' booklet, '**All about osteoporosis and bone health**', or visit our website.

An acidic diet

Can foods cause 'acidity' in the bloodstream? It's suggested by supporters of 'the alkaline diet' that a typical Western diet creates bloodstream acidity because of its high protein content. This triggers the body to correct the acidity with calcium salts (an alkali) drawn out from bones resulting, theoretically, in weaker bones. Although there is some fact behind these claims, there is good evidence that alkaline-type foods might be good for bones for other reasons, and that for most people bloodstream acidity won't play a big role in their bone health.

What is an alkaline diet?

An alkaline diet is one where food choices are made to influence the level of acidity (the pH) in the bloodstream. It has been proposed that a high intake of vegetables and fruit and a lower intake of protein foods such as meat, grains and dairy (for example, an 80:20 ratio) may reduce acidity in the body and have a number of health benefits, including reduced bone loss, fewer fractures and prevention of osteoporosis. Incidentally, this issue is around an acidic environment in the bloodstream and is completely unrelated to excessive stomach acidity causing indigestion and acid reflux, and also has nothing to do with citrus fruits which we think of as being 'acidic' in another way.

How does the body deal with 'acidity' in the bloodstream?

The body aims to keep blood pH within a narrow alkaline range and it does this very effectively, mainly through the action of the kidneys which remove excess acidity in the urine, and through the lungs which expel 'acidic' carbon dioxide when we breathe. This usually corrects the problem without resorting to drawing calcium out of bones to put into the bloodstream. As a consequence, consuming an 'acidic' range of foods may influence the acidity of urine but has not been shown to alter blood pH much outside of the normal range.

Will testing my blood or urine tell me if my blood pH is alkaline because of my diet?

It's not that simple. Blood pH remains relatively stable so testing it isn't helpful in telling you the effects your diet is having. When there is any slight pH change in the bloodstream the kidneys will immediately start to remove excess acidity into the urine to quickly restore the normal blood pH.

As a result, urine pH may fluctuate, but this will be different from the pH level in the bloodstream. Consequently the usefulness of home testing kits to measure urine pH is questionable.

So does following an alkaline diet have any benefits for my bones?

Eating plenty of fruit and vegetables has the potential to have an alkaline effect in the body and can help to balance out acid-forming foods. However it's not clear that following a strict alkaline diet and restricting 'acidic' foods reduces a high risk of fractures. The claim that an alkaline diet is beneficial to bones was first developed from early studies, based mostly on people with severe kidney disease and it may not be applicable to generally healthy people. There is also a concern that older people may cut down on their protein intake based on the alkaline diet recommendation when adequate protein is essential at their time of life (see the section 'Other nutrients and bone health' and 'Protein'). It would be sensible therefore to have a varied, nutrient-rich diet incorporating foods from all the main food groups (see the Eatwell Guide) as this has been proven to be beneficial to bone health and strength.

I've heard that dairy is 'acidic' and causes osteoporosis. Is this true?

Some dairy may be classed as being 'acidic' but there is no convincing evidence that dairy causes osteoporosis. Interestingly, the pH of milk is close to being neutral, i.e. neither acidic nor alkaline, so there is no truth to the claims that milk has an acidic effect in the body and 'leaches' calcium from bones. Some hard cheeses such as cheddar can have an acidic effect on urine although there is no evidence that cheese causes osteoporosis. However, as always it is important to eat any food in moderation as part of a well-balanced diet.

Milk and dairy products provide an inexpensive and easily available source of calcium that is well absorbed by most people. They also provide other valuable nutrients which have a useful part to play in bone health. If dairy is omitted from the diet for personal or medical reasons it is vital that enough calcium is provided from other food sources.

See our booklet, 'Better bone health for everybody', for more information on daily calcium requirements and calcium-rich foods.

Whilst there is very good evidence that food and drink as part of a healthy, varied and balanced diet provide the best source of nutrients for bones, there's limited evidence on the effects of taking nutrient supplements on bone health. In many cases it's not possible to recommend supplements routinely to keep bones healthy and strong.

Getting more information and support

We hope this fact sheet answers many of the questions you have about the role of individual nutrients in bone health, and has explained how to easily obtain these nutrients from food and drink.

For more information about osteoporosis and bone health, including fact sheets on all available drug treatments, visit our website at theros.org.uk/info or order more of our printed publications.

If you need more information or support, talk to your healthcare professional.

You can also call our specialist Helpline nurses with any questions or concerns about bone health or living with osteoporosis, for free, on **0808 800 035**, or email them at nurses@theros.org.uk



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This information is based on the latest evidence and clinical practice. It should not replace advice from your own healthcare professionals.

To give us feedback on this fact sheet, email us at health.info@theros.org.uk

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