



## What is osteoporosis?

Osteoporosis occurs when the struts which make up the mesh-like structure within bones become thin causing them to become fragile and break easily, often following a minor bump or fall.

These broken bones are often referred to as 'fragility fractures'.

The terms 'fracture' and 'broken bone' mean the same thing. Although fractures can occur in different parts of the body, the wrists, hips and spine are most commonly affected.

It is these broken bones or fractures which can lead to the pain associated with osteoporosis. Spinal fractures can also cause loss of height and curvature of the spine.

You need vitamin D to help regulate the way your body uses calcium and to ensure your bones, muscles and teeth remain strong. The condition associated with vitamin D deficiency is called osteomalacia (or rickets in children). This is not the same as osteoporosis. For healthy adults in the UK, much of the vitamin D you get is obtained by the action of sunlight on your skin alongside foods that contain vitamin D.

As we cannot make vitamin D in our skin from October to March some people might not have enough to last over the winter and may need a supplement to boost their diet.

Recent advice from Public Health England (PHE) in 2016 is for everyone to get a daily intake of 10 micrograms of vitamin D. As we don't know who is getting enough sunlight exposure to make vitamin D, and to cover the minority of people that might be at risk of vitamin D deficiency, PHE have given a dietary recommendation for everyone.

For more information about getting enough vitamin D for strong bones including safe sunlight exposure and food sources, see our booklet All about osteoporosis; our leaflet Healthy Living for Strong Bones or our website.

## Will taking vitamin D supplements prevent osteoporosis and make my bones stronger?

Getting enough vitamin D from sunlight and food sources is important for strong muscles and bones. Taking a supplement can help to increase your intake to recommended levels.

However extra vitamin D over and above these amounts is unlikely to improve bone strength.

Osteoporosis is not specifically due to vitamin D deficiency and having a very high intake of vitamin D isn't a guarantee against osteoporosis and fractures.

## Will taking vitamin D supplements help prevent other medical conditions?

If you have osteomalacia, vitamin D supplements (often with calcium supplements) are essential. However, it's not clear whether vitamin D supplementation helps with other conditions.

The recent Department of Health committee report on vitamin D looked at the available evidence for benefits in terms of other conditions such as reproductive health (mothers and babies), cancer, heart disease and multiple sclerosis.

They found there wasn't enough evidence to draw firm conclusions. The advice from the committee focused on bone and muscle health particularly the prevention of osteomalacia and rickets (soft bones), muscle weakness and falls.

## Should I take a vitamin D supplement and what dose do I need?

Vitamin D supplements are recommended if you are likely to be getting inadequate amounts from sunlight and food sources (naturally occurring or fortified).

Public Health England recommends a supplement:

From birth to one year (unless receiving 500 ml or more of formula milk which is fortified with vitamin D)	8.5 to 10 micrograms
1 to 4 year olds	10 micrograms
Over 4 years and adults if you aren't exposed to much sunlight*, if you cover up your skin for cultural reasons; you are frail, housebound or confined indoors for long periods or who use sunblock for medical reasons.	10 micrograms

\*around 10 minutes twice a day without suncream taking care not to burn. Sunlight only makes vitamin D in your skin from April to September.

Talk to your doctor if have a condition or treatment such as the following when a vitamin D supplement may also be important:

- severe liver or kidney disease or a condition that affects the way you absorb food
- long-term anti-epileptic drugs, because these alter the way vitamin D is broken down and used by the body and can affect the absorption of calcium.

Pregnant and breastfeeding women and people with darker skin because of their ethnic origin are not in the 'need a supplement' group (see above) but, like everyone, need to make sure they are getting sufficient vitamin D in food and, if not, consider taking supplements all year round. The recommendation is that everyone should make sure that they are getting 10 micrograms daily from food sources and consider whether they need a supplement especially during the autumn and winter months (the end of September through to the end of March).

10 micrograms (µg) is equal to 400 International Units (IU)
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### Are higher doses sometimes needed?

10 micrograms (400IU) is the recommended dose of vitamin D if you are an adult although doctors may prescribe 800IU (20 micrograms) especially if you have a bone condition such as osteoporosis. Even if you are 'deficient,' that is, you have had a test that shows very

low levels of vitamin D in your blood, this 800IU dose is often sufficient.

If a blood test shows very low vitamin D levels, and you are also getting bone pain as a result then higher doses may be prescribed to rapidly improve your vitamin D levels. You may be given a total of approximately 300,000 IU vitamin D, either as weekly or daily doses over 6 to 10 weeks, before you go down to the lower dose taken long term (usually 800IU).

You may also be prescribed these higher doses for a short time if you have low blood levels and you are about to start an osteoporosis drug treatment such as denosumab or zoledronic acid. These drugs can lower the calcium levels in your bloodstream which can make you unwell if levels fall too low. Getting adequate vitamin D and calcium before and while you take a drug treatment stops this happening.

Your local hospital might have a slightly different way of managing vitamin D deficiency, the information provided here is based on the National Osteoporosis Society Guideline produced by a group of UK clinical and scientific experts.

The Department of Health recommends that babies from birth to one year of age who are being breastfed or getting less than 500ml (about a pint) of infant formula (which is fortified with vitamin D) a day, should be given a daily supplement containing 8.5 to 10micrograms of vitamin D

### Can I take too much vitamin D and what are the symptoms?

High intakes of vitamin D for prolonged periods can be toxic so it is important that supplements do not provide more than 100 micrograms of vitamin D daily. (The upper limit is 50 micrograms a day for children from 1-10 years and 25 micrograms for babies under a year).

Toxicity would be unusual but causes high levels of calcium in the blood with nausea, vomiting, thirst and weakness. Medical treatment would be needed to correct this.

Remember, however, these are 'toxicity' levels and much higher than the doses generally recommended. The current advice is to take 10 micrograms (400IU) daily unless prescribed for a specific reason by your doctor. It is at these lower levels that positive benefits have been found and, as with any supplement, taking high doses without medical supervision could have unknown or unintended consequences.

If you have bought and are taking a number of different supplements, check how much vitamin D you are taking in total to ensure it is a sensible amount.

Generally foods and fortified foods (with fortification at

its current levels) provide small amounts of vitamin D which are very unlikely to cause you any problems.

### **Are there any special instructions for taking vitamin D supplements?**

No, vitamin D supplements can be taken with or without food and at any time of the day. However if you are taking an osteoporosis drug treatment such as alendronic acid or risedronate (bisphosphonates) then you must separate them out from any supplements (read the instructions on your packet). Bisphosphonate drugs can't be absorbed by the body and therefore won't work unless you take them on a completely empty stomach (drinking water is not a problem).

### **Which is the best vitamin D supplement?**

Most supplements contain vitamin D3 (cholecalciferol) which may be slightly more effective than vitamin D2 (ergocalciferol). However D2 is vegan (D3 is derived from lamb's wool) so may be the only acceptable supplement for some people.

If you are taking vitamin D because you have a bone condition, such as osteoporosis, it might be preferable to take a prescribed supplement from your doctor as these products will have been carefully tested to make absolutely sure that they work well.

Vitamin D is available as a tablet, drops, spray or injection. Tablets are cheapest and usually the best option. There are some uncertainties about whether the injectable form works as quickly or as well as tablets so you will usually only be given an injection if you have a condition that affects the way you absorb anything taken by mouth.

Vitamin D tablets or drops for babies and young children can be bought from most pharmacies and larger supermarkets. If you are claiming income support or other state benefits you are entitled to 'Healthy Start' vouchers for free supplements until your child is 4 years old.

For information about vitamin D added to foods see our booklet **All about Osteoporosis** or our website.

### **Do vitamin D supplements cause side effects?**

No, vitamin D supplements rarely cause side effects although calcium in supplements can do – many people are taking the two together.

(See our Calcium supplements and tests fact sheet for more information).

### **Can I get a supplement suitable for a vegetarian or vegan?**

Vitamin D3 products may be vegetarian, (check with

the manufacturer), but D3 (cholecalciferol) is difficult to obtain in a vegan form. There are some lichen-derived products you can buy which are suitable for vegans although how effective they are is less certain.

### **Do I need to take both calcium and vitamin D? Can I get a vitamin D supplement without calcium?**

Supplements are prescribed together if you need both. This may be because you are older and frailer and there is concern you might not be getting sufficient of either especially if you are living in a nursing or residential home.

You can buy, or be prescribed, either calcium or vitamin D separately if you don't need both. If you are getting sufficient calcium in your diet but need extra vitamin D then you may be advised to take vitamin D supplements alone.

### **Why aren't vitamin D blood tests carried out routinely to check I am getting sufficient?**

Because it's often unnecessary and therefore not cost effective. Research has shown that there are some individuals, particularly those who don't get out in the sunshine, who probably aren't getting enough vitamin D and it makes sense for them to take a supplement to ensure they are getting what they need.

A blood test is not necessary to confirm this and a supplement won't cause any harm in sensible doses. Another issue is that a one off blood test won't necessarily give a complete picture of your vitamin D levels throughout the year – Public Health England is currently suggesting a winter supplement would be beneficial for anyone uncertain whether food sources are providing sufficient amounts at times of the year when sunlight isn't able to create vitamin D in your skin. You will sometimes be given a blood test if you are being investigated or treated for various bone diseases including osteoporosis and osteomalacia (soft bones). Even then, you might not need a test before supplements are prescribed if your situation suggests you are very likely to need a supplement.

Your doctor, or other health professional, will often do a blood test if you have bone pain symptoms that could be related to vitamin D deficiency or if you are starting on an osteoporosis drug treatment given by infusion or injection (zoledronic acid or denosumab).

If you have a very low blood level of vitamin D in these situations a higher dose of vitamin D supplement than normal will be prescribed initially (see above).

## **I have had vitamin D blood test at the osteoporosis clinic at the hospital. What do the results mean?**

The blood test measures a circulating form of vitamin D called 25 hydroxyvitamin D (serum 25OHD). Your kidneys convert this into an 'active form' that your body can use.

Unfortunately there isn't a simple, normal range with supplementation recommended if your result is abnormal. Most experts agree that a result greater than 50nmol/L would certainly be adequate but whether everyone needs to aim for this and will benefit is unclear. It is agreed that a result below 25-30nmol/L is an indication of risk of vitamin D deficiency and supplementation would be important.

Current UK government advice aims to ensure no one is deficient. Your doctor will be able to advise you about your results depending on your situation.

## **How do I know the the supplements are giving me sufficient vitamin D? Don't I need a blood test to check this?**

If you take the prescribed dose of vitamin D then, as with any supplement, you can be confident you are getting enough and you usually won't need a test to check vitamin D levels in your blood have improved.

If you have a medical condition such as Crohn's disease that could affect how you absorb medicines or you have 'bone pain' which continues despite having taken supplements, then your doctor might want to use repeat blood test as the results may affect treatment decisions.

**For more information about calcium, vitamin D and healthy eating for strong bones and who needs a vitamin D supplement see our website or our booklet *All about osteoporosis*. There is a summary in our leaflet *Healthy Living for Strong Bones*. There is also a 'vitamin D rich food chooser' in our publications and on our website. For information about calcium supplements and tests, see our fact sheet.**

The **National Osteoporosis Society** is the only UK-wide charity dedicated to improving the prevention, diagnosis and treatment of osteoporosis and fragility fractures. The Charity receives no Government funding and relies on the generosity of individuals to carry out its vital work.

### **For osteoporosis information and support contact our Helpline:**

 **0808 800 0035**

 **nurses@nos.org.uk**

### **To become a member or make a donation:**

 **01761 473 287**

 **join online at [www.nos.org.uk](http://www.nos.org.uk)**

### **To order an information pack or other publications:**

 **01761 471 771**

 **info@nos.org.uk**

**or download from our website at [www.nos.org.uk](http://www.nos.org.uk)**

This fact sheet is one of a range of publications produced by The National Osteoporosis Society. If you would like more general information about osteoporosis see our booklet *All about Osteoporosis*.

**This information reflects current evidence and best practice but is not intended to replace the medical advice provided by your own doctor or other health professional.**