

Vitamin D in Orthopaedics

What is Vitamin D and how does it work?

Vitamin D is a vitamin that helps the body manages calcium. Calcium keeps your bones strong and is needed for muscles to contract. Vitamin D also has a role in immune function and cell division, helping your body deal with infection and cancer. Vitamin D has effects on many different organs and tissues all over the body.

What are the problems of low Vitamin D?

Having a low level of vitamin D causes problems with bones and muscles, it can also cause bone and muscle pain, fatigue and mood problems.

Bone problems:

- Rickets is weak bones in children who are growing caused by low vitamin D. This can lead to bending or deformity of bones.
- Osteomalacia is weak bones in adults caused by low vitamin D. This causes bone pain and makes fractures (broken bones) more likely. Sometimes fractures occur with no injury.

Muscle problems:

- Low vitamin D causes problems with muscles contracting (which need calcium)
- Typically, it is the big muscles that feel weak, around the shoulders and hips. It can also cause muscle cramps.
- People with low vitamin D are more likely to have a fall.

Immunity problems:

- Vitamin D is known to help with normal immunity.

Other issues:

- Low vitamin D has been linked with infections, asthma, multiple sclerosis, type 2 diabetes and auto-immune conditions.

Why is having a low vitamin D important to Orthopaedics?

People who are deficient in vitamin D are more likely to fall and their bones are more likely to have fractures (broken bones) after just a small injury or no injury.

Vitamin D deficiency can cause isolated and generalized muscle and bone pain. Some patients who are referred to see an orthopaedic surgeon due to pain in their limbs may have vitamin D deficiency. If the pains are caused by low vitamin D, the arthritis might not need an operation.

Vitamin D is important in bone healing. People who have had a fracture or fusion operation (a procedure commonly done for arthritis in the joints of the foot or ankle) may take much longer to heal and recover if they have insufficient levels of vitamin D.

Surgeons and patients want to get the best results from an operation. We encourage people to get fit before their operation. If vitamin D is causing weak muscles around the hips, thighs and buttocks, this might delay a person getting out of bed, so delay getting home after surgery, and may also make blood clots more likely. Having a low mood or fatigue might also reduce how easy it is to bounce back after an operation or a fracture.

Many orthopaedic patients are advised to supplement their vitamin D, especially those having fusion operations or those at higher risk of fracture non-union.

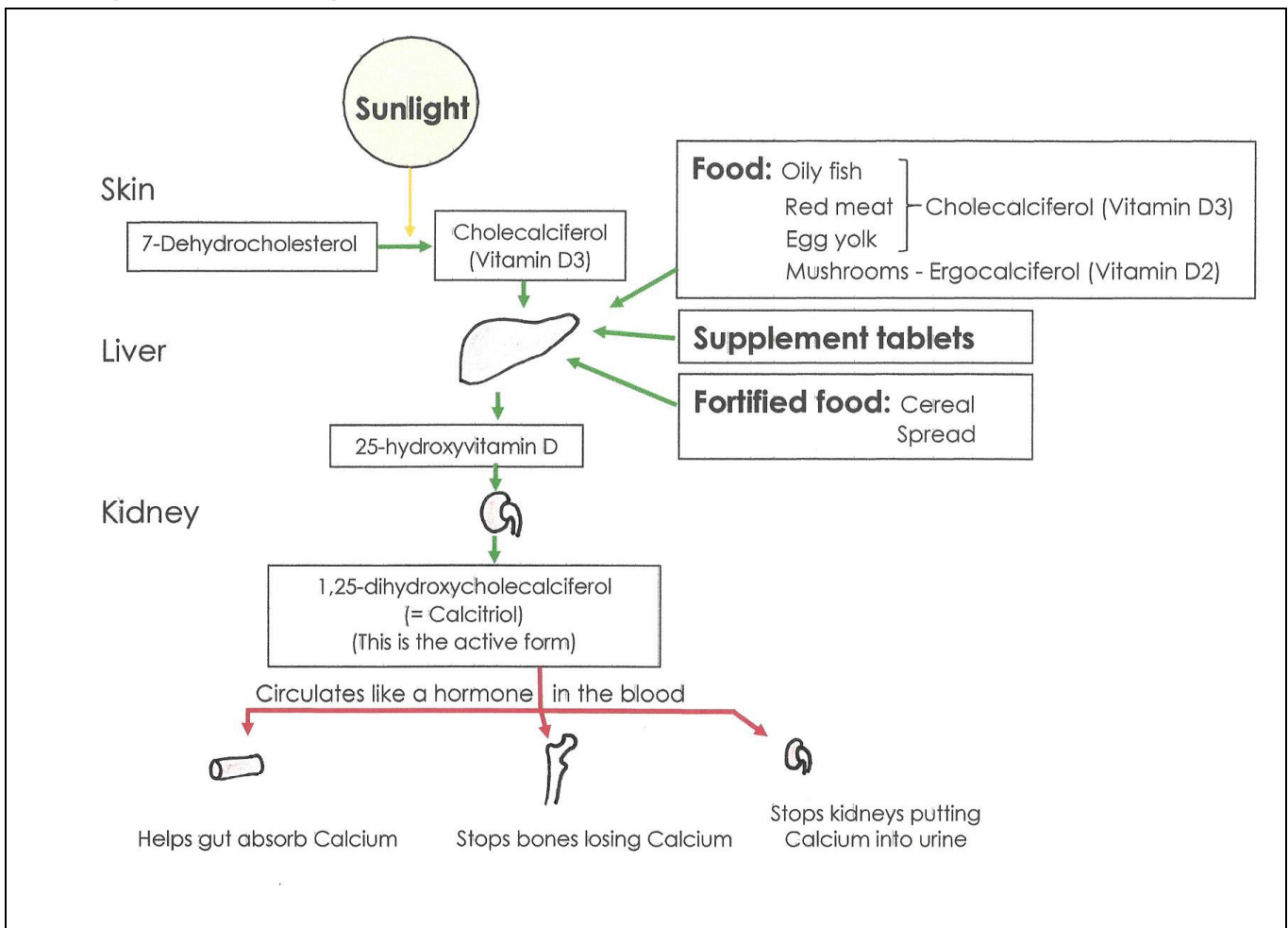
How do I get enough vitamin D?

There are two sources of vitamin D:

1. Vitamin D3 (Cholecalciferol) is made in the skin when ultraviolet light shines on it.
2. Through food. It is fat soluble. Oily fish and egg yolk are good sources. Some food, such as breakfast cereal, is fortified with vitamin D.

Cholecalciferol is inactive. It travels (in the bloodstream) to the liver, then to the kidney where it is converted to the active form.

A diagram showing where vitamin D comes from and what it does:



How low is a low vitamin D?

A low level is called vitamin D insufficiency. A very low level is called vitamin D deficiency.

	as Serum 25-hydroxy vitamin D	% of UK adults
A normal level of Vitamin D	50 – 125 nmols/l	45%
Vitamin D insufficiency	25 – 50 nmols/l	35%
Vitamin D deficiency	Below 25 nmols/l	20%

How common is it?

It is very common to have low vitamin D. The level varies across the seasons. In Winter, more than half UK adults have a level of vitamin D that is below what is considered normal. Even in the Summertime, about 20% of UK adults are vitamin D deficient.

Who is most at risk of having a low vitamin D?

People who get less sun exposure:

- People with darker skin
- People who spend much of their time indoors
- People who cover more of their skin

People who don't get enough dietary vitamin D:

- People who have a vegan or vegetarian diet, or one low in fish or fortified cereals
- People who have Crohn's disease, cystic fibrosis or other problems with intestines.

People who cannot make vitamin D:

- People with chronic liver or kidney disease

People who store vitamin D where it is not used:

- People with obesity

People taking certain medications:

- Anticonvulsants (epileptic medicine), steroids or some other drugs.

How do I get more vitamin D from sunlight?

The NHS website states that from early April to the end of September, the majority of people should be able to get all the vitamin D they need from sunlight on their skin. This is when sunlight of the correct wavelength reaches the UK. Between October and March, we do not get enough vitamin D from sunlight. Vitamin D stores only last a few weeks. More vitamin D is made in the middle of the day, on sunny days and when air pollution is less. People with darker skin need longer sun exposure. Sunscreen blocks vitamin D manufacture.

You cannot overdose on vitamin D through exposure to sunlight. But always remember to cover up or protect your skin if you're out in the sun for long periods to reduce the risk of skin damage and skin cancer.

In summer, it takes 20 minutes of sunlight on face and forearms or lower legs for a light-skinned person to get a daily dose of vitamin D. This can be combined with time for exercise, which is proven to improve health, build bone strength and reduce the risk of complications after surgery. The Chief Medical Officer recommends a minimum of 150 minutes per week of moderate exercise.

How do I get more vitamin D from food?

Oily fish (sardines, salmon, herring and tuna), red meat and egg yolk are good sources of vitamin D. Some foods are fortified, including some cereals and spreads.

It is also important to maintain dietary intake of calcium, as both calcium and vitamin D are needed to prevent long-term adverse effects on the bones. Rich sources of calcium include dairy foods (milk, cheese, and yoghurts) and oily fish.

Should I take vitamin D supplements?

The NHS recommends that you take a daily supplement throughout the year if you:

- are not often outdoors – for example, if you're frail or housebound
- are in an institution like a care home
- usually wear clothes that cover up most of your skin when outdoors

It also states that if you have dark skin – for example you have an African, African-Caribbean or south Asian background – you may also not get enough vitamin D from sunlight.

If you do not get enough vitamin D from your diet, you may decide to take vitamin D supplements for the six months of the year when sun exposure is less.

NICE (National Institute for Health and Care Excellence) issued guidance in 2016 recommending that all adults living in the UK should take a daily supplement containing 400 international units (10 micrograms) of vitamin D throughout the year.

Many supplements can be bought cheaply from a pharmacy or supermarket without a prescription. Vitamin D supplements come as tablets, a spray for under the tongue or as a chewable jelly. People at very high risk may discuss a stronger supplementation option from their GP.

Adults should not take more than 100 micrograms (4,000 IU) of vitamin D a day as it could be harmful. Breast milk contains low levels of vitamin D and there are specific recommendations for children that can be found on the NHS website below.

What are the risks of too much vitamin D?

Taking too much vitamin D results in excess circulating calcium, which can damage the kidneys and heart. It can also make bones weaker.

Should I get my vitamin D level tested?

A test is possible for vitamin D, but this is not a routine test. If you have a test, be aware that levels change over the year due to exposure to sunlight. Because the risks of increasing vitamin D are so low, the NHS advises anyone at risk of low level of vitamin D to increase this, rather than get a test first.

Where can I get more advice about preparing for an operation?

There is lots of information at www.cpoc.org.uk/patients

Sources of information

<https://www.nhs.uk/conditions/vitamins-and-minerals/vitamin-d/>

<https://cks.nice.org.uk/topics/vitamin-d-deficiency-in-adults-treatment-prevention/>

<https://www.gov.uk/government/publications/sacn-vitamin-d-and-health-report>

<https://www.nhs.uk/conditions/rickets-and-osteomalacia/>

<https://bnf.nice.org.uk/treatment-summary/vitamins.html>

www.versusarthritis.org

<https://www.aomrc.org.uk/reports-guidance/exercise-the-miracle-cure-0215/>

<https://theros.org.uk/information-and-support/bone-health/vitamin-d-for-bones/>

Important information

The information in this leaflet is for guidance purposes only and is not provided to replace professional clinical advice from a qualified practitioner.

Your comments

We are always interested to hear your views about our leaflets. If you have any comments, please contact the patient experience team on 0300 131 4784 or esh-tr.patientexperience@nhs.net.

Hand hygiene

We are committed to maintaining a clean, safe environment. Hand hygiene is very important in controlling infection. Alcohol gel is widely available at the patient bedside for staff use and at the entrance of each clinical area for visitors to clean their hands before and after entering.

Other formats

If you require any of our leaflets in alternative formats, such as large print or alternative languages, please contact the Equality and Human Rights Department on 0300 131 4434 or esh-tr.AccessibleInformation@nhs.net

After reading this information are there any questions you would like to ask? Please list below and ask your nurse, practitioner or doctor.

Reference

The following clinicians have been consulted and agreed this patient information:

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The Clinical Specialty/Unit that have agreed this patient information leaflet:
Department of Trauma and Orthopaedics

The directorate group that has agreed this patient information leaflet:
Diagnostic, Anaesthetic and Surgery

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Responsible clinician/author: Prof Scarlett McNally – Consultant Orthopaedic Surgeon

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