

# Vegans

## and the sunshine vitamin

Stephen Walsh ©

Vitamin D dominated recent press coverage of vegan diets following reports that a vegan child in Glasgow had “the spine of an 80-year-old” apparently due to rickets. Press comment ranged from claims that it was unethical for parents to impose unusual diets on their children to well balanced statements about the need for an informed approach to any type of diet.

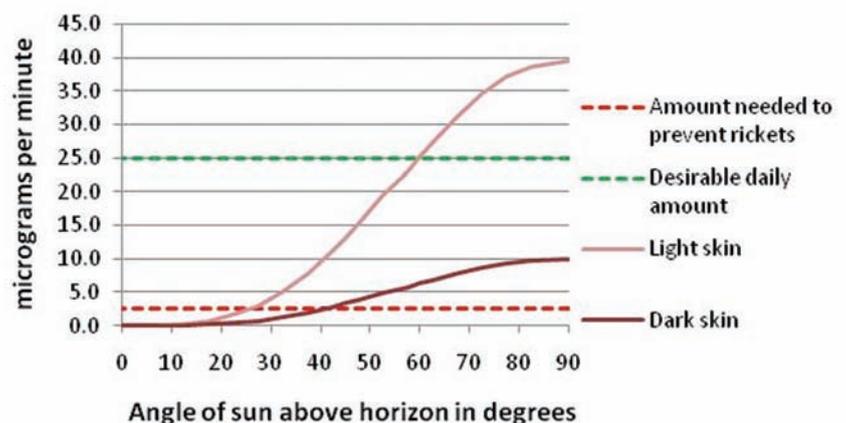
**R**ickets is primarily caused by insufficient vitamin D, though low calcium intakes can also contribute. The main source of vitamin D is exposure of skin to sunlight when the sun is reasonably high in the sky.

If your shadow is much longer than you are, the sun is not high enough. Clothes, sunblock and glass windows all block the ultraviolet wavelengths in sunlight that both cause sunburn and produce vitamin D. Variations in the darkness of skin (differing amounts of melanin) have arisen due to the changing trade-off between avoiding damage from the sun and making vitamin D as humans settled further from the equator.

Vitamin D production increases in proportion to the area of skin exposed to sunlight. The ideal duration of skin exposure to get the benefits without unnecessary damage is about a third of the time that would lead to sunburn. For white skinned people in the UK the ideal exposure time varies from about five minutes around midday in the summer to about twenty minutes in late autumn while for darker skinned people considerably longer exposures are needed.

Within the UK there is a lengthy “vitamin D winter” when the sun is not high enough in the sky even at midday to produce a useful amount of vitamin D. This is exacerbated by less skin being exposed less often once the temperature begins to fall in the autumn.

Amounts of vitamin D produced by exposing face, hands and arms to sun for five minutes with a cloudless sky and without sunblock



Vitamin D levels therefore vary seasonally, usually being lowest in late winter and highest in late summer. If sun exposure is good, the main effect of diet is during this vitamin D winter when it provides a safety net against vitamin D stores falling too low. The vitamin D winter is longer in Scotland than in southern England, increasing the risk of rickets and other health problems.

It is worth noting that even in countries without a vitamin D winter, deficiency can occur due to restricted exposure to sunlight. Also, the ability to produce vitamin D from the action of sunlight on skin declines with age.

Just 2.5 micrograms (100 international units, IU) per day of dietary vitamin D is generally sufficient to prevent rickets, but higher amounts are likely to be beneficial in other ways. A recent review of trials of vitamin D supplements, with typical doses of 10 to 20 micrograms ( $\mu\text{g}$  or  $\text{mcg}$ ), indicated a 7% reduction in death rate from all causes. Around 25 micrograms per day is sufficient to largely eliminate seasonal variations in vitamin D stores in Europe and the USA. In recent years, many experts have suggested that 25 micrograms per day from a combination of sun and diet is needed to maintain healthy levels throughout the year.

There are two forms of vitamin D: vitamin D2 and vitamin D3. Vitamin D2 is generally derived from plant sterols while D3 is derived either from animal skins or wool or from cholesterol (itself normally derived from animals). Several studies using high doses of vitamin D indicated that the vegan form of vitamin D, vitamin D2, was less effective than vitamin D3. However, a very thorough study published in 2008 has shown that at a daily dose up to 25 micrograms (1000 IU) the two types of vitamin D are equivalent in raising circulating levels and that there are no adverse interactions between them.

The average amount of dietary vitamin D in the UK is around 3 micrograms per day. Meat and fish together contribute about half this amount and eggs a further 10%. Milk contributes virtually no vitamin D at all. The other main sources in the general diet are fortified fat spreads and fortified breakfast cereals. While fat spreads in the UK are fortified with vitamin D2, fortified breakfast cereals are often fortified with D3 which is derived from animals. Fortified soya milks can be a significant source for some people, but it is all too easy for

vegans – and, indeed, other vegetarians – to have no dietary intake at all, thus increasing the risk of rickets and other health problems.

The first line of defence to maintain healthy vitamin D levels is frequent exposure of skin to sunlight – at least twice a week and ideally every day – while taking care not to get burnt. Lunchtime walks in the autumn carry very little risk of excessive exposure while boosting vitamin D stores when they are most needed. Similarly, lunchtime walks in the spring will rebuild stores quickly. Much less vitamin D is produced on overcast days, so **on sunny days in autumn and spring make a point of getting outside in the middle of the day.**

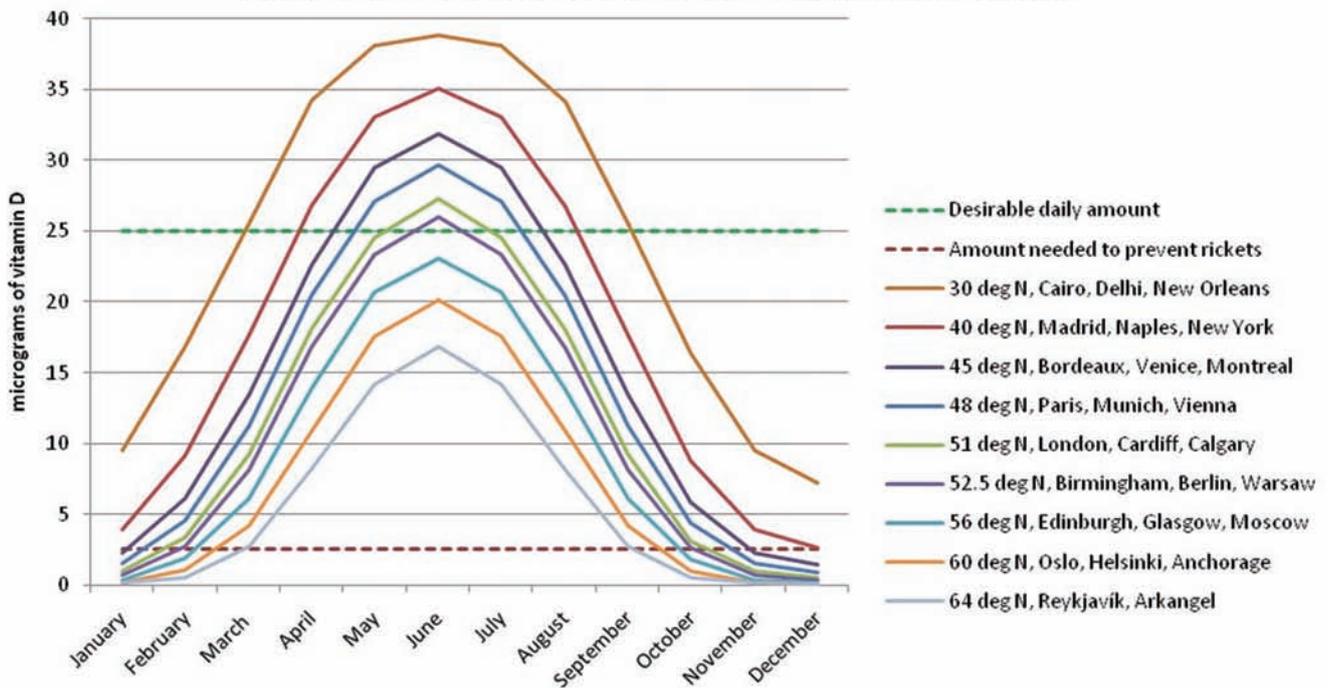
The charts accompanying this article are based on the website [http://nadir.nilu.no/~olaeng/fastr/VitD\\_quartMED.html](http://nadir.nilu.no/~olaeng/fastr/VitD_quartMED.html) prepared by Ola Engelsen and Ann Webb. The main chart shows how much vitamin D can be made in different locations at different times of the year under cloudless conditions by exposing face, hands and arms (about 25% of skin) at midday for five minutes.

In autumn and spring in the UK much longer exposures are safe without using sunblock, but always use your own experience and judgement to avoid burning. It is safer to expose more skin for a shorter time than less skin for a longer time.

The second line of defence is to use a vitamin D supplement whenever effective sun exposure is limited. The Vegan Society's VEG 1 supplement includes 10 micrograms (400 IU) of vitamin D2. This is twice the amount in most multi-vitamins and matches the highest UK recommendations (for adults over 65). It is, however, lower than US recommendations for adults over 70 (15 micrograms) and lower than the amount that is now widely recommended (25 micrograms from diet and sunlight combined).

EU guidelines set a safe upper limit of 25 micrograms per day *from diet and supplements* up to ten years of age and 50 micrograms thereafter while US guidelines set the same limits but with an age threshold of one year. *There is no risk of overdosing through getting out in the sun in addition to taking a supplement.*

**Amounts of vitamin D produced by exposing face, hands and arms to sun for five minutes at midday on the 21st of the month with a cloudless sky and without sunblock**



The amounts of vitamin D shown are for light, easily burned skin. For olive or light brown skin divide by two and for very dark skin divide by four.