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A SUMMERTIME CONUNDRUM

Henri Davy navigates the line between sun safety and vitamin D sufficiency in children

Summertime is here, and with it comes the opportunity to make some vitamin D just by catching some rays. Yet this can leave parents in something of a quandary, having to navigate the fine line between adequate sun exposure and the risk of sunburn.

The UK recommended daily vitamin D intake for anyone over the age of one is 10 micrograms (ug) or 400 international units (IU). Achieving this through sunshine, however, can be a challenge; especially in children whose skin has been slathered with high factor sunscreen. Lotions with an SPF of 30 or more have been found to reduce vitamin D synthesis by 95%.¹

So what is vitamin D, why do we need it and how can we ensure children get enough, safely?

An essential nutrient

Vitamin D has numerous roles and more recently has been speculated to

reduce the severity of Covid-19. It is, however, more commonly known for its importance in bone health; notably it aids absorption of calcium, which is necessary for skeletal growth and bone health. A concern with children is that severe vitamin D deficiency can lead to rickets, resulting in poor growth and soft, weak or misshapen bones. Cases are rare but the last decade has seen a rise in rickets-related hospital admissions.² Other conditions associated with (but not necessarily caused by) low vitamin D status include obesity, insulin resistance, and allergic and respiratory issues.

SYNERGY

It is worth noting that vitamin D does not act alone, and recent studies have shown that it needs magnesium to be activated. Gut bacteria diversity may also be essential to activating it.

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Making vitamin D

When skin is exposed to sunlight, ultraviolet B (UVB) rays convert a chemical in the skin (7-dehydrocholesterol) to vitamin D. From there, it is transformed in the liver and then kidneys into the hormonally-active form known as calcitriol.

Although getting a bit of sunlight sounds straight forward, numerous factors influence vitamin D synthesis including clothing, time of year, time of day, latitude, air pollution, sunscreen and skin colour.³ Also, when it comes to skin colour, a report by the Scientific Advisory Committee on Nutrition⁴ highlighted the following advice: of six skin types, those with very light skin or fair/red hair or freckles (types I and

II) do not need much time in the sun to synthesise vitamin D, but do have a higher risk of sunburn or skin cancer. People with darker skin (types V and VI) may need to expose their skin for longer; possibly for three to five times as long as someone with fair skin, according to one small study.⁵ However, although darker skin may endure lengthier periods in the sun, there is still a risk of sunburn — or skin cancer when there is long term, prolonged exposure.

Sunscreen

With so many variables to consider, the answer to 'how much time?' is far from certain and where conflict arises. The NHS advises for babies and children to be covered up, be in the shade during optimal vitamin D-making times (10am to 3pm), and to be protected by at least SPF 15 sunscreen.⁶ So even if children are in the sun when it's at its strongest, sunscreen acts to filter out a high proportion of UVB rays, preventing vitamin D production.

It is for this reason that getting vitamin D from sunshine alone is not straight forward. One Polish study looking at whether children could synthesise the recommended daily dose of vitamin D from sunshine alone, based on the country's 2018 guidelines, proposed that children aged one to 10 should spend at least 15 minutes outside without sunscreen, with uncovered forearms and lower legs between 10am and 3pm (from May to September).⁷

Yet a separate analysis of clothing, UV index, time outdoors and skin-synthesised vitamin D concluded that a longer period of 45 minutes to an hour was likely to be required, whilst

STOCKING UP

Being fat soluble, vitamin D is found in fat (adipose) tissue. To discover whether the body draws on these reserves, one clinical trial looked at serum (blood) levels for a year after vitamin D supplementation (taken for three to five years) was stopped. The authors concluded that adipose stores may have a clinically relevant effect on vitamin D levels the following year.⁸

ensuring shoulders, ears and foreheads were covered. In reality, however, getting it 'right' is difficult because we cannot know when the 'recommended dose' has been reached. Recognising this, researchers suggested an alternative solution of allowing children to play outside as long as possible without getting sunburn; although even this would be unrealistic for most carers. It may feel like one step too far having to hover around a child, whipping out the sunscreen at the precise moment their skin begins to change colour.

Food and supplements

It is possible to get some vitamin D from food sources, such as:

- A boiled egg, 1.8ug
- 90g fried lamb's liver, 0.5ug
- 50g UVB treated mushrooms, 2.5ug
- 100g grilled herring, 16.1ug
- 100g tinned salmon, 9.2ug
- 100g grilled mackerel, 8.8ug
- 100g grilled salmon, 7.1ug

But without a daily glug of cod liver oil (an old-fashioned form of supplementation which contains 10.5ug per 5g) food sources alone are unlikely to provide all of our vitamin D requirements. The final option is to supplement in the form of drops for babies or chewable tablets for

older children. The NHS currently recommends everyone to supplement in autumn and winter, with those who have limited sun exposure or dark skin encouraged to supplement all year round. It also recommends a supplement for children under five, even if they get out in the sun.

Toxic overload

However, something to keep in mind with concentrated supplements is the risk of toxicity. Because vitamin D is fat soluble, excess cannot be excreted in urine (as occurs with water soluble vitamins such as vitamin C), and toxic overload is possible. Symptoms of this include nausea and vomiting, loss of appetite, excessive thirst, frequent urination, constipation, abdominal pain, muscle weakness, aching muscles or joints, confusion and fatigue. A more serious consequence is the risk of kidney stones. An advantage to sunshine generated vitamin D is that it is not associated with toxicity.

When the sun provides vitamin D for free it seems a shame to waste it as a resource; and for those confident about their child's burning point, any exposure without sunscreen would contribute to keeping the vitamin D factory chugging along. Balancing it against the risk of sunburn, however, some carers may feel more comfortable slathering the sunscreen whilst switching to a lower factor to allow for some vitamin D production.

But for a self-confessed helicopter parent like myself, with three type Is who are averse to oily fish, the back-up of a supplement seems sensible. For anyone uncertain about whether to supplement their child's vitamin D, it is recommended to consult a healthcare practitioner.

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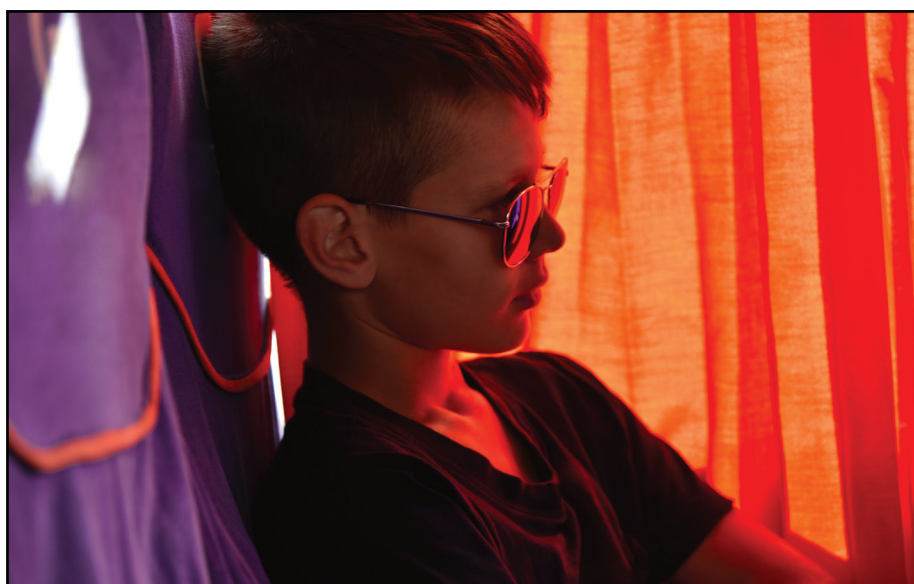


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