NHS
Cornwall and Isles of Scilly

Vitamin D Deficiency – Management guidelines for adults

Vitamin D is essential for optimal bone and musculoskeletal health. Deficiency can develop when there is inadequate exposure to sunlight or a lack of vitamin D in the diet. Dietary sources of vitamin D are limited and consumption of food sources alone, in the absence of skin synthesis, will not provide optimal vitamin D status. We do not make enough vitamin D from sunlight in the autumn and winter months between October and March.

Public Heath England (2016) Recommends that from October to March everyone should consider taking a daily supplement containing 10 micrograms (400 international units, IU) of vitamin D.
People who have very little or no exposure to sunlight through the summer months and are advised to take a supplement containing 400IU of vitamin D throughout the year.
In these groups, supplementation is suggested without measurement of 25-OHD (25 hydroxyvitamin D – the main circulating form of the vitamin. An appropriate over the counter low strength preparation of approximately 10 micrograms or 400 IU can be bought at low cost from any pharmacy, supermarket or health food shop. For more information, please see NHS Cornwall and Isles of Scilly ICB Vitamin D for adults - information leaflet
Do not take more than one supplement containing vitamin D, including fish liver oils and high-dose multivitamin supplements, as this may lead to vitamin A toxicity.
Taking more than 10 micrograms of vitamin D daily is not necessary for everyone, but if you are unable to find a vitamin D supplement providing 10 micrograms, doses providing up to 25 micrograms (1000 IU) are safe and suitable.

Vitamin D deficiency

Low vitamin D status (vitamin D deficiency) is defined by the Department of Health (DHSC) as a plasma concentration of 25-OHD of below 25 nmol/litre (equal to 10 ng/ml).

Predisposing factors

- Inadequate UV light exposure: Northern latitude, air pollution, habitual sunscreen use, dark or pigmented skin, institutionalised, housebound, reduced mobility, living in a care home, clothing which limits sunlight exposure or avoidance of sunlight.

- Age: 65 years and older

- Poor diet, malabsorption including short bowel, cholestatic jaundice, Crohn's Disease, cystic fibrosis, coeliac disease, cholestyramine use, weight loss surgery

- Metabolic risk - Reduced synthesis, pregnant and breastfeeding women, infants who are exclusively breast fed, obesity, increased breakdown e.g., drugs (rifampicin, anticonvulsants particularly phenytoin, phenobarbital and carbamazepine treatment, highly active antiretroviral treatment, glucocorticoids, colestyramine, thiazide diuretics), reduced stores, for example in liver disease.

The Royal Osteoporosis Society (ROS) have published a practical guideline to support health professionals with an aim to provide a uniform approach in the management of adult patients with vitamin D deficiency. This provides clarity on who should be tested for vitamin D deficiency, how the results should be interpreted and how deficiency should be treated.

NHS England (NHSE) has published Guidance on conditions for which over the counter items should not routinely be prescribed in primary care. This includes the prescribing of vitamins and minerals, except for where there is a medically diagnosed deficiency, or when using calcium and vitamin D for osteoporosis (see formulary choices), or for treating malnutrition including alcoholism. The guidance also excludes children suitable to receive Healthy Start vitamins. Therefore, patients should be advised to buy their vitamin D supplements over the counter (OTC) unless they meet the above exceptions. Maintenance or preventative treatment is not an exception.
For patients who will be purchasing vitamin D supplements OTC, we advise educating patients about the indication and dosing. It is recommended that licensed vitamin D products are used for treatment doses**.** The use of food supplements for maintenance or prophylactic doses is generally lower risk due to a wider margin of error.

When to measure vitamin D levels

It is recommended to treat patients suspected of vitamin D deficiency empirically. This recommendation is made in consideration of the drug cost compared to vitamin D laboratory test costs, and the negligible risk of vitamin D3 toxicity at advised doses.
Routine monitoring of serum vitamin D is not usually necessary; however, it may be appropriate in patients with symptomatic vitamin D deficiency, malabsorption syndromes, or if poor compliance is suspected.
Please note: Requests by GPs (general practice) for vitamin D testing require a clear indication or rationale for the test.

Cornwall and Isles of Scilly

Advice from Royal Osteoporosis Society makes recommendations on when testing is justified and suggests checking 25-OHD levels may be considered in these groups:

- Possible osteomalacia or rickets
- Proximal muscle weakness
- Persistent hypo or hypercalcaemia (based on corrected calcium level)
- Newly diagnosed osteoporosis
- Conditions associated with malabsorption; e.g.; Cystic fibrosis, Crohn's disease,

Interpretation of vitamin D levels – Assess need for treatment based on serum 25OHD level

In agreement with the Institute of Medicine (IOM), they propose that vitamin D thresholds are adopted by UK practitioners in respect to bone health. Please refer to the flowchart below for guidance on oral treatment of vitamin D deficiency, prescribing choices can be found on the CIOS formulary.

Before acting on a blood test result, consult a specialist if a patient has a medical condition: primary hyperparathyroidism, renal insufficiency, or hypo or hypercalcaemia.
Concurrent illness and seasonal factors should be considered when interpreting Vitamin D results. Recent illness or operations may cause a falsely low reading.

Patients with high or high-normal calcium levels and vitamin D deficiency may have coexistent primary hyperparathyroidism. Consider referral to a specialist clinic with an interest in calcium e.g. endocrine.

Patients with significant hypomagnesaemia (Mg2+ <0.5mmol/l) from any cause may develop significant hypocalcaemia due to ineffective release of PTH. PTH measurement is not recommended in patients with severe hypomagnesaemia as it may be uninterpretable. Replacement with combination magnesium and activated vitamin D may be necessary - seek specialist help.

Alfacalcidol or calcitriol should NOT be used for routine treatment of vitamin D deficiency as they carry a higher risk of toxicity and require close monitoring.

Routine repeat vitamin D testing is not required for doses under 2000IU/day.

NHS
Cornwall and Isles of Scilly

Treatment of vitamin D deficiency depending on Serum 25-OH vitamin D level (nmol/L)

> 50 Sufficient

Promote self-care

- Provide lifestyle advice on safe sun exposure and dietary sources of vitamin D
- Advise patients may purchase appropriate dose vitamin D supplementation over the counter (OTC) during October-March.

25-50 Insufficiency

Do these apply to the patient?
Risk factors where treatment may be required:

- Fragility fractures/osteoporosis/high fracture risk
- Symptoms suggest vitamin D deficiency
- Starting therapy with a potent antiresorptive agent (denosumab/teriparatide/zoledronate)
- At increased risk of developing deficiency:
  - Raised PTH
  - Reduced UV exposure
  - Treatment with antiepileptics or glucocorticoids
  - Malabsorption conditions

No

Maintenance oral therapy
Colecalciferol 800 - 2,000IU daily. Advise patients to purchase OTC – a variety of preparations are available to buy (low dose vitamin D supplements will not routinely be prescribed by the GP)

A calcium and vitamin D product may be considered for the treatment of osteoporosis: consider prescribing a combined product containing 400iu colecalciferol (twice a day dose) see formulary choices

Yes

<25 Deficiency

High dose vitamin D treatment (loading course)
Recommended treatment is based on fixed loading doses. Given as either weekly or daily split doses.

Available treatment regimens:

- 50,000 IU once a week for 6 weeks (300,000IU total)
- 20,000 IU twice a week for 7 weeks (280,000IU total
- 1000 IU four times a day for 10 weeks (280,000IU total)

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Malabsorption syndromes: Coeliac disease, Cystic Fibrosis, Crohn's disease

Oral therapy is more effective than IM injections except in cases of significant malabsorption where intensive high-dose replacement or maintenance treatment may be needed under specialist supervision.

Treatment options for malabsorption syndromes include:

- High dose oral therapy e.g., 20,000 IU - 25,000 IU oral colecalciferol weekly
- IM injection of ergocalciferol. Initially 300,000 IU IM injections 3 months apart followed by maintenance treatment of 300,000 IU IM 6 monthly (a licensed product). If the injection is used, close monitoring of serum and urinary calcium, phosphate and renal function is needed to avoid hypercalcaemia.

Maintenance therapy of vitamin D up to 4000IU/day for malabsorption syndromes may be appropriate following specialist advice.

Renal disease

Patients on haemodialysis at RCH have their vitamin D levels reviewed and replaced as necessary as part of their dialysis care and therefore will be excluded from this guideline.

Drug induced vitamin D deficiency

If the patient is taking drugs that accelerate Vitamin D metabolism or if there are concerns regarding absorption, then higher doses may be required. The Medicines and Healthcare Regulatory Agency have advised that vitamin D supplementation should be considered for at risk patients who receive long term treatment with primidone, phenytoin, carbamazepine, phenobarbital, or sodium valproate. Other such medications include corticosteroids.

References:

Vitamin D deficiency in adults | Health topics A to Z | CKS | NICE

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

Royal Osteoporosis Society https://www.healthystart.nhs.uk/getting-vitamins/

MHRA warning: Antiepileptics effect on bone

Imperial Centre for Endocrinology: Vitamin D guidelines

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