

Vitamin D

Text Size:

Basics

Advertisement

Background

[Synonyms](#)

Evidence

Dosing

[Safety](#)

[Methodology](#)

[Selected references](#)

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Evidence

These uses have been tested in humans or animals. Safety and effectiveness have not always been proven. Some of these conditions are potentially serious, and should be evaluated by a qualified healthcare provider.

Familial hypophosphatemia

Familial hypophosphatemia (low blood levels of phosphate in the blood) is a rare inherited disorder that consists of impaired phosphate transport in the blood and diminished vitamin D metabolism in the kidneys. Familial hypophosphatemia is a form of rickets. Taking calcitriol or dihydrotachysterol by mouth along with phosphate supplements is effective for treating bone disorders in people with familial hypophosphatemia. Management should be under medical supervision.

A

Fanconi syndrome-related hypophosphatemia

Fanconi syndrome is a defect of the proximal tubules of the kidney, and is associated with renal tubular acidosis. Taking ergocalciferol orally is effective for treating hypophosphatemia associated with Fanconi syndrome.

A

Hyperparathyroidism due to low vitamin D levels

Some patients may develop secondary hyperparathyroidism due to low levels of vitamin D. The initial treatment for this type of hyperparathyroidism is vitamin D. For patients with primary or refractory hyperparathyroidism, surgical removal of the parathyroid glands is commonly recommended. Studies also suggest that vitamin D supplementation may reduce the incidence of hypoparathyroidism following surgery for primary hyperparathyroidism (partial or total removal of the parathyroid glands).

A

Hypocalcemia due to hypoparathyroidism

Hypoparathyroidism (low blood levels of parathyroid hormone) is rare, and is often due to surgical removal of the parathyroid glands. High oral doses of dihydrotachysterol (DHT), calcitriol, or ergocalciferol can assist in increasing serum calcium concentrations in people with hypoparathyroidism or pseudohypoparathyroidism.

A

Osteomalacia (adult rickets)

Adults with severe vitamin D deficiency lose bone mineral content ("hypomineralization") and experience bone pain, muscle weakness, and osteomalacia (soft bones). Osteomalacia may be found among elderly patients with vitamin D-deficient diets, individuals with decreased absorption of vitamin D, individuals with inadequate sun exposure (such as those living in latitudes with seasonal lack of sunlight), patients with gastric or intestinal surgery, patients with aluminum-induced bone disease, patients with chronic liver disease, or patients with kidney disease with renal osteodystrophy. Treatment for osteomalacia depends on the underlying

A



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cause of the disease and often includes pain control and orthopedic surgical intervention, as well as vitamin D and phosphate binding agents.

Psoriasis

A number of different approaches are used in the treatment of psoriasis skin plaques. Mild approaches include light therapy, stress reduction, moisturizers, or salicylic acid to remove scaly skin areas. For more severe cases, treatments may include UV-A light, psoralen plus UV-A light (PUVA), retinoids such as isotretinoin (Accutane), corticosteroids, or cyclosporine (Neoral®, Sandimmune®). The synthetic vitamin D3 analog calcipotriene (Dovonex®) appears to control skin cell growth and is used for moderately severe skin plaques, particularly for skin lesions resistant to other therapies or located on the face. Vitamin D3 (tacalcitol) ointment has been reported as being safe and well-tolerated. High doses of becocalcidiol (a vitamin D analog) used on the skin may be beneficial in the treatment of psoriasis. **A**

Rickets

Rickets develop in children with vitamin D deficiency due to a vitamin D-deficient diet, a lack of sunlight, or both. Infants fed only breast milk (without supplemental vitamin D) may also develop rickets. Although now rare, partially due to the availability of vitamin D-fortified milk, there has been a recent increase in rickets among children in latitudes with periodic, seasonal lack of sunlight. Ergocalciferol or cholecalciferol is effective for treating vitamin D deficiency rickets. Calcitriol should be used in patients with renal (kidney) failure. Treatment should be under medical supervision. **A**

Muscle weakness/pain

Vitamin D deficiency has been associated with muscle weakness and pain in both adults and children. Limited research has reported vitamin D deficiency in patients with low-back pain, and supplementation may reduce pain in many patients. **B**

Osteoporosis (general)

Without sufficient vitamin D, inadequate calcium is absorbed and the resulting elevated parathyroid (PTH) secretion causes increased bone resorption. This may weaken bones and increase the risk of fracture. Vitamin D supplementation has been shown to slow bone loss and reduce fracture, particularly when taken with calcium. **B**

Renal osteodystrophy

Renal osteodystrophy is a term that refers to all of the bone problems that occur in patients with chronic kidney failure. Oral calcifediol or ergocalciferol may help manage hypocalcemia and prevent renal osteodystrophy in people with chronic renal failure undergoing dialysis. **B**

Anticonvulsant-induced osteomalacia

Supplementation with vitamin D2 has been reported to reduce seizure frequency in initial research. Further study is needed to confirm these results. **C**

Breast cancer prevention

High-dose vitamin D supplementation may be associated with a slightly reduced risk of developing breast cancer. Additional study in this area is warranted. **C**

Cancer prevention

Limited research suggests that synthetic vitamin D analogs may play a role in the treatment of human cancers. However, it remains unclear if vitamin D deficiency raises cancer risk, or if an increased intake of vitamin D is protective against some cancers. Until additional trials are conducted, it is premature to advise the use of regular vitamin D supplementation to prevent cancer. **C**

Colorectal cancer

Data from a meta-analysis suggest that supplemental vitamin D may prevent the development of colorectal cancer. More research is needed in this area. **C**

Corticosteroid-induced osteoporosis

C

Some evidence implies that steroids may impair vitamin D metabolism, further contributing to the loss of bone and development of osteoporosis associated with steroid medications. There is limited evidence that vitamin D may be beneficial to bone strength in patients taking long-term steroids.

Diabetes (type 1/type 2)

Type 1 diabetes : It has been reported that infants given calcitriol during the first year of life are less likely to develop type 1 diabetes than infants fed lesser amounts of vitamin D. Other related studies have suggested using cod liver oil as a source of vitamin D to reduce the incidence of type 1 diabetes. There is currently insufficient evidence to form a clear conclusion in this area. **Type 2 diabetes** : In recent studies, adults given vitamin D supplementation were shown to improve insulin sensitivity. Further research is needed to confirm these results.

C

Fall prevention

Multiple trials have found conflicting results for the effects of vitamin D in the prevention of falls. More studies are needed.

C

Hepatic osteodystrophy

Metabolic bone disease is common among patients with chronic liver disease, and osteoporosis accounts for the majority of cases. Varying degrees of calcium malabsorption may occur in patients with chronic liver disease due to malnutrition and vitamin D deficiency. Oral or injected vitamin D may play a role in the management of this condition.

C

High blood pressure (hypertension)

Low levels of vitamin D may play a role in the development of high blood pressure. It has been noted that blood pressure is often elevated under the following conditions: during the winter season, at a further distance from the equator, and in individuals with dark skin pigmentation (all of which are associated with lower production of vitamin D via sunlight). However, evidence is not clear, and a comparison with more proven methods to reduce blood pressure has not been conducted. Patients with elevated blood pressure should be managed by a licensed healthcare professional.

C

Hypertriglyceridemia

There is insufficient evidence in this area.

C

Immunomodulation

Preliminary human evidence suggests that vitamin D and its analogues, such as alfacalcidol, may act as immunomodulatory agents. More studies are needed to confirm these results.

C

Mortality reduction

Intake of vitamin D may be associated with a reduction in total mortality. Additional evidence is needed to confirm this association.

C

Multiple sclerosis (MS)

Scientists have detected MS rates to be lower in areas with greater sunlight and higher consumption of vitamin D rich fish. Preliminary research suggests that long-term vitamin D supplementation decreases the risk of MS; however, additional research is necessary before a firm conclusion can be reached.

C

Myelodysplastic syndrome

There is insufficient evidence in this area.

C

Osteogenesis imperfecta (OI)

OI is a genetic disease that consists of unusually fragile bones that break easily, often under loads that normal bones bear daily due to a malfunction in the body's production of collagen. Proper calcium and vitamin D intake is essential to maintaining strong bones.

C

C

Osteoporosis (cystic fibrosis patients)

Osteoporosis is common in patients with cystic fibrosis (due to fat malabsorption, which leads to a deficiency of fat-soluble vitamins such as vitamin D). Oral calcitriol administration appears to increase the absorption of calcium and decrease parathyroid concentrations.

Proximal myopathy

There is insufficient evidence in this area.

C**Rickets (hypophosphatemic vitamin D-resistant)**

There are insufficient data to support a role of vitamin D in this condition.

C**Seasonal affective disorder (SAD)**

Seasonal affective disorder (SAD) is a form of depression that occurs during the winter months, possibly due to reduced exposure to sunlight. In one study, vitamin D was found to be better than light therapy in the treatment of SAD. Further studies are necessary to confirm these findings.

C**Senile warts**

In early study, senile warts have been treated with topical vitamin D3.

C**Skin pigmentation disorders (pigmented lesions)**

Application of vitamin D3 ointment on the skin, in combination with intense pulsed-radio frequency, may be beneficial in the treatment of pigmented lesions associated with neurofibromatosis 1 (NF1).

C**Tooth retention**

Oral bone and tooth loss are correlated with bone loss at non-oral sites. Research suggests that intake levels of calcium and vitamin D aimed at preventing osteoporosis may have a beneficial effect on tooth retention.

C**Vitamin D deficiency (infants and nursing mothers)**

High-quality clinical trial evidence suggests that high doses of supplemental vitamin D provided to breast feeding mothers may improve the vitamin D status of both mother and child. More research is needed to confirm these findings.

C**Weight gain (postmenopausal)**

Vitamin D supplementation (in combination with calcium) may have an effect on post-menopausal weight gain. Evidence suggests this may be particularly true in women consuming inadequate calcium and warrants further study.

C**Muscle strength**

Oral cholecalciferol does not appear to increase muscle strength or improve physical performance in healthy older men who are not vitamin D deficient.

D**Prostate cancer**

There is preliminary evidence based on laboratory and human studies that high-dose vitamin D may be beneficial in the treatment of prostate cancer. However, the induction of hypercalcemia at the doses required to inhibit cancer proliferation have impeded its use in clinical trials. This treatment, including the development of non-calcemic analogs, remains under active investigation; however, clear evidence of benefit is not yet available.

D**Key to grades**

- A** Strong scientific evidence for this use
- B** Good scientific evidence for this use
- C** Unclear scientific evidence for this use
- D** Fair scientific evidence against this use (it may not work)
- F** Strong scientific evidence against this use (it likely does not work)

» [Grading rationale](#)

Uses based on tradition or theory

The below uses are based on tradition or scientific theories. They often have not been thoroughly tested in humans, and safety and effectiveness have not always been proven. Some of these conditions are potentially serious, and should be evaluated by a qualified healthcare provider.

Actinic keratosis, Alzheimer's disease associated hip fractures, ankylosing spondylitis, autoimmune disorders, Graves disease, hyperparathyroidism in renal dialysis, hypocalcemia, hypocalcemic tetany, kidney transplant-related bone loss, metabolic disorders (metabolic syndrome), nervous system disorders (hemichorea), osteitis fibrosa in dialysis, rheumatoid arthritis, scleroderma, squamous cell carcinoma, systemic lupus erythematosus, vaginal disorders (atrophy), vitiligo.

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Portions of this document last updated: April 1, 2011

NS_patient-vitamind



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