

# Zinc

## Introduction

When it comes to good health, zinc really matters. It's needed to make over 300 enzymes function including for DNA repair and Vitamin A metabolism.

Over a thousand papers a year are published on zinc and yet doctors often remain unaware of its uses.

A clue to what happens if you don't have enough zinc comes from the condition **acrodermatitis entoropathica**. This is usually a congenital illness which normally starts at birth and is caused by an inability to absorb zinc. (Sometimes it can be acquired later in life with conditions such as anorexia and alcoholism). **The child develops skin lesions, hair loss, diarrhoea and retarded growth and mental function, a range of eye disorders, poor immunity, eventually leading to death if zinc is not given.** So you might not be surprised to know that zinc deficiency affects the skin, the eyes, the bowels and the brain.

Zinc is necessary for RNA polymerase, which is needed for the synthesis of all the proteins in the body.

## Could I be low in zinc?

Yes, this is quite likely. It is thought that 48% of the population are at risk of zinc deficiency. There has been a large drop in zinc levels in children since the 1980s. It is declining in the soil so even if you are eating the right foods, it may not be enough. Vegetarians are at high risk of zinc deficiency as are the elderly. The more protein you eat the more zinc you will use and need. Two studies of athletes have shown low zinc levels, probably because they sweat it out during exercise. Zinc is not stored in the body so we need to replenish it on a daily basis.

## Can drugs lower zinc?

Yes. PPI drugs such as omeprazole and lansoprazole block absorption as do laxatives. The contraceptive pill alters the zinc/copper ratio and the anticonvulsant valproic acid binds to zinc. Alcohol, steroids, diuretics, and penicillamine can all reduce zinc. Both iron and calcium supplements block zinc absorption (so are best taken at a separate time) but not Vitamin C. Sugar inhibits zinc absorption.

## What foods contain zinc?

A rich source is oysters. Seafood generally is high in zinc, but zinc is also found in meat, nuts, ginger, beans, egg yolk, bran and oatmeal but this will all depend on how much zinc is in the soil.

## What foods block zinc?

Phytates (found in grains, legumes & seeds) can bind zinc as can oxalates (found in spinach, berries, tea). A patient with persistent low zinc was found to be drinking 20 cups of tea a day. When she stopped drinking the tea, her zinc returned to normal.

## **What sort of zinc should I take and how much?**

How much zinc do we need? In the long-term the upper limit has been put as low as 40mg daily (according to National Institute of Health, USA) but this could be overcautious as zinc is generally very safe. The main danger of higher doses is copper deficiency which can cause anaemia and palpitations. However this usually happens after prolonged doses of over 200mg daily. The risk is easily avoided by taking extra copper when using higher doses of zinc. (The zinc/copper ratio should be 8:1).

Some people initially need much higher amounts, up to 160mg daily for up to two years. **Patients with low zinc will initially need about 30mg three times daily until improvement and then it can be tapered down monthly to 30mg daily.** Children of 4 to 8 and a half stone pounds start with 30mg twice daily and those of 2 to 4 stone 30mg daily tapering to 15mg daily. If under 2 stone start with 15mg daily. Many conditions that need zinc will also need essential fats (see leaflet).

Children, the elderly and especially teenagers (boys more than girls) tend to have low zinc levels. Frequent ejaculations can lower zinc, as these contain 5mg zinc (normal daily intake is 10 mg).

Zinc picolinate is the best absorbed form of zinc with zinc citrate a close second. Zinc sulphate (the one prescribed on the NHS) is poorly absorbed. It is best absorbed if taken away from food, ideally last thing at night.

## **Signs of deficiency**

White spots on fingernails, cracks in skin (especially behind the ear), poor taste and smell. Poor immunity, nightmares, growing pains, poor night vision, poor wound healing, loss of appetite and flickering eyes could also be a sign of zinc deficiency.

## **Why illnesses are associated with low zinc?**

### **Anorexia (including Anorexia Nervosa)**

**One of the most overlooked diseases linked to zinc deficiency is anorexia nervosa. The symptoms of zinc deficiency include loss of appetite and distortion of taste.** Work done by Dr Alex Schauss found that **women with anorexia described their bodies differently after months of treatment with zinc.** Zinc sulphate heptahydrate may be particularly useful. In one controlled study **those women given zinc gained twice the weight of those on placebo.** A successful nineteenth century treatment for anorexia in the UK was oysters (which are very high in zinc).

In one study, 10 out of 13 with anorexia and 8 out of 14 with bulimia had zinc deficiency. A problem with treatment of anorexia with zinc is that as the weight goes up the zinc can drop again.

## **Immunity**

**Another overlooked area is immunity. Zinc maybe the most important mineral for the immune system.** Zinc enhances both humoral and cell-mediated immunity (the two major parts of immunity) and also makes natural killer cells more effective. **The critical immune hormone thymosin, produced by the thymus gland, contains zinc.** Zinc has an antimicrobial effect and inhibits viral replication. Zinc is needed in the production of glutathione, which is essential for immunity.

Zinc reduces the shrinking of the thymus gland (one of the most important parts of the immune system) with age. **Animal research has shown zinc deficiency in pregnancy can reduce immunity for three generations of offspring, even if they are given adequate zinc in later life.**

One study by Prasad in 2007 found that zinc supplementation in a group of patients aged 55 to 87 who took 45mg zinc for a year **reduced infections by 300% and antibiotic use by 600%.** Zinc is both an anti-oxidant and anti-inflammatory.

## **ADHD**

Sometimes known as hyperactivity; this has become a common problem in children. These children have been found to have lowered zinc levels in nine studies. They also excrete more zinc with certain foods and additive, notably tartrazine. Supplementing zinc is usually beneficial (although other supplement, especially Omega 3 and 6 fats are usually needed too).

## **Benign prostate hypertrophy (BPH)**

The prostate gland has the highest concentration of zinc. Research at Cook County hospital, Chicago found that treatment with zinc led to shrinkage of their enlarged prostates. This has been witnessed clinically, especially if combined with essential fats.

## **Acne**

Three months of zinc typically leads to a 50% reduction in acne.

## **Rosacea**

In a study from 2006, zinc taken for three months reduced symptoms by 75%.

## **Wound Healing**

**Zinc significantly accelerates wound and ulcer healing.** Because it helps repair DNA cell replication is enhanced. Calamine lotion probably owes its healing properties to its high zinc content. Zinc oxide paste improves healing of leg ulcers by 83%.

## **Birth Defects**

Although folic acid is well-known to reduce spina bifida and similar defects, it is less well-known that vitamin B12 and zinc do the same. This is not surprising as these are all involved in DNA repair.

## **Schizophrenia**

Schizophrenics have 50% less zinc in their brains than non-schizophrenics. Dr Carl Pfeiffer found the combination of zinc and manganese drops (often with B vitamins) had lasting clinical benefit in schizophrenics with low zinc. Zinc deficiency is implicated in a range of other neurological disorders.

## **Poor Sleep in Babies**

One study found babies waking after midnight had improved sleep on 12mg zinc and 1mg manganese. Note: breast milk contains more zinc than formula feeds.

## **Macular degeneration**

The highest concentration of zinc is in the retina. Supplements may slow down this condition but ideally these are most helpful when given intravenously with other key nutrient (see macular degeneration leaflet).

## **Hair Loss**

The congenital condition acrodermatitis enteropathica causes hair loss. High dose zinc has been observed to restore hair loss in some individuals.

## **Eczema**

A study by Kiln found significant improvements in eczema with zinc supplementation. A combination of zinc and essential fats frequently improves eczema in children. Skin cracks, often on the heel are usually helped by zinc, often combined with essential fats and sometimes high-dose Vitamin A.

## **Digestion**

We need zinc to produce carbonic anhydrase. Without this we cannot produce enough stomach acid. Insufficient acid leads to poor protein absorption. Zinc is also needed for pancreatic enzymes.

## **Sexual Health**

Zinc is fundamental to sexual and reproductive health in both sexes. Studies on animals show zinc deficiency is associated with infertility, miscarriages, and higher rates of congenital malformation. Impotence, low sex drive and low sperm count can also be caused by zinc deficiency.

Impotence has been linked with deficiencies of Vitamin C and zinc. Those given 120mg of zinc citrate had increased sperm counts.

## **AIDs**

Low zinc levels occur in greater than 50% of AIDs patients. Zinc supplementation for 18months has been found to reduce immunological failure by 76%.

## **Diabetes**

Zinc levels are lower in diabetics and zinc supplementation has been shown to balance control of blood sugar. Zinc enhances the action of insulin.

## **Cholesterol**

Zinc supplementation reduces cholesterol, triglycerides and LDL and increases HDL.

## **Cirrhosis and Liver Disease**

Many liver diseases, including alcoholic hepatitis and cirrhosis are associated with severe zinc deficiency and all markers of liver function improve with zinc supplementation. It also significantly reduces the risk of hepatocellular carcinoma of the liver.

## **Detoxification**

Zinc is essential for both phases of detoxification (Phase1 and Phase2) and also regulates glutathione production.

## **Hypothyroidism**

Zinc deficiency blocks the conversion of T4 to T3 and zinc level is inversely related to T3 (in diabetics).

## **Chronic Pancreatitis**

This is associated with low serum zinc, especially in those over 60. Those with the highest dietary zinc significantly reduce their risk of pancreatic cancer.

## **Inflammatory Bowel Disease**

In Crohn's disease 40% are short of zinc.

## **Rheumatoid Arthritis**

Researchers in Seattle compared zinc (three times daily) to placebo for three months and found it reduced joint swelling and tenderness, morning stiffness and overall wellbeing.

## **Mental Function**

Children with acrodermatitis have a range of mental issues. A high copper/zinc ratio impairs mental function. However, zinc is important for mental function for all of us and a study of students found zinc supplementation for ten weeks improved memory and learning.

### **Temporal Arteritis**

This condition can respond to zinc. However, treatment with steroids is still needed because of the risk to eyesight.