

Zinc Deficiency

What effect does zinc deficiency have on the skin?

Zinc deficiency results in skin changes that can look like atopic dermatitis in the early stages. The difference is that zinc deficiency does not improve when treated appropriately with topical steroids and moisturisers.

The skin takes on a cracked, glazed and fissured “crazy paving” appearance around the mouth, the nappy area and the hands. The person may experience hair loss, nail changes and an increased chance of getting diarrhoea as well as skin and other infections. The affected person may be irritable and experience a general failure to thrive.

What causes zinc deficiency?

Zinc deficiency can be inherited

Acrodermatitis enteropathica (AE) is caused by a genetic error that results in the deletion of a zinc transport protein. AE tends to present when weaning a child from breast milk.

Zinc deficiency may occur as a result of:

Inadequate dietary intake of zinc, for example in premature, very sick infants or premature breastfed infants whose mothers may suffer from a mild zinc deficiency.
Inability of the body to absorb zinc, for example in diseases affecting the gut.
Medicines such as thiazide and loop diuretics, angiotensin converting enzyme inhibitors and angiotensin receptor blockers increase the loss of zinc through the urine.

Medical conditions that may have similar symptoms

Rare inherited or acquired metabolic conditions that result in deficiencies in amino acids, essential fatty acids and biotin can result in skin signs that mimic zinc deficiency.
Glucagonoma is a rare tumour that can also result in similar skin findings.

How is zinc deficiency diagnosed?

Severe cases of zinc deficiency can be diagnosed with a blood test measuring zinc levels however this is less reliable for mild deficiency.
Alternatively, zinc deficiency may be diagnosed by testing for:
Alkaline phosphatase (ALP): Alkaline phosphatase is a zinc dependent enzyme and levels are low in severe cases of zinc deficiency
Albumin: Zinc binds to albumin and albumin levels should therefore be checked to avoid misinterpretation of serum zinc results.

Sometimes the success of a trial treatment is proof enough of the existence of a zinc deficiency (Note: When treating a zinc deficiency, you would expect to see rapid improvement in the appearance of the skin, with marked improvement within 72 hours).

How is zinc deficiency treated?

Zinc replacement is the treatment of choice.

The dosage varies depending on the underlying cause of the deficiency. For example:

A person with inherited zinc deficiency may require ongoing zinc replacement. A person with AE may require zinc replacement of 1 to 3 mg/kg/day

For zinc deficiency due to poor diet, replacement with zinc may be short-term (until levels normalise, checking 3 to 6 monthly), assuming dietary intake increases

In people with gut problems that result in difficulty absorbing zinc, ongoing zinc supplements may be needed until the problem resolves.

The replacement dose is based on the amount of "elemental" zinc content needed. Zinc is available as zinc sulphate and zinc gluconate and 10 mg of zinc sulphate may contain 2.27 mg of elemental zinc. For a 10 kg child a 1 mg/kg replacement dose would be approximately 44mg of zinc sulphate. Zinc gluconate is better absorbed than zinc sulphate.

For children, capsules can be opened and added to food, or tablets can be crushed and added to food. Some pharmacists make up a solution for zinc replacement in children.

Be aware that high dose zinc replacement can affect copper absorption.

In food, zinc content is directly related to protein content, and this may be significant for those who are on protein restricted diets.