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IRON DEFICIENCY AND ANAEMIA

Why is iron so important in our diet?

The mineral **iron** has many essential functions in our bodies. A few examples of the vital functions of iron include the generation of **energy** in our cells, the formation of **haemoglobin** in red blood cells to transport oxygen throughout the body, the transport of oxygen within our muscle cells and the functioning of the immune system and brain.

CONSEQUENCES OF IRON DEFICIENCY

Tiredness, fatigue, irritability, loss of appetite and pica (eating non-food substances).
Reduced attention span, poor learning and impaired performance.
Reduced exercise stamina and muscle strength.
Impaired body temperature regulation with increased sensitivity to cold.
Reduced immune system functioning and susceptibility to infections.

Who is most susceptible to iron deficiency?

Iron deficiency is one of the most common nutritional concerns in Australia. The life stages where iron deficiency is particularly prevalent is in **infants, toddlers and pre-schoolers;** as well as **adolescents** during periods of rapid growth; and **women** during their reproductive years. In particular, baby's iron stores become depleted by around six months of age, so sufficient iron-rich foods need to be introduced at this stage to support development and learning. In Australia, dietary guidelines recommend the introduction of iron-enriched infant cereals as the first solid food at around 6 months of age. Young children and adolescents often do not meet iron requirements due to the increased demands of rapid growth. Adolescent females and women in their child-bearing years require significantly more dietary iron than their male counterparts, whilst a pregnant woman's daily requirements of iron are triple that of men. It is thus difficult for pregnant women to obtain sufficient iron through diet alone and they will generally require a daily iron supplement on recommendation of their doctor.

RECOMMENDED DIETARY INTAKE OF IRON *(per day)*

AGE	**RDI** (mg)	**AGE**	**RDI** (mg)
7-12 months	11mg	Male adult	8mg
1-3 years	9mg	Female 19-50 years	18mg
4-8 years	10mg	Female >51 years	8mg
9-13years	8mg	Pregnancy	27mg
Male 14-18 years	11mg	Lactation 14-18 years	10mg
Female 14-18 years	15mg	Lactation 19-50 years	9mg

COMMON CAUSES OF IRON DEFICIENCY AND ANAEMIA

- Diets low in iron-rich foods eg some vegetarian or vegan diets, low energy diets, fad diets, disordered eating practices or very high carbohydrate diets.
- Pregnancy or recent pregnancy.
- Intensive training programs, particularly running; athletes have higher requirements for iron and often also suffer higher losses through exercise.
- Impaired absorption of iron in the gastro-intestinal tract, or bleeding in the GI tract, due to inflammatory bowel diseases, adverse effects of medications or undiagnosed or poorly managed coeliac disease.
- Medications that reduce acid production in the stomach as iron requires an acidic environment for absorption.
- Medications such as tetracycline antibiotics and antacids that bind with iron and prevent absorption.
- Blood loss; or blood donations where iron stores are not adequate.

If iron deficiency is not treated adequately; it may progress to the more serious condition of anaemia in which iron stores are depleted and there are insufficient healthy red blood cells for transporting oxygen.

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DIETARY SOURCES OF IRON

Dietary iron is present as either haem or non-haem iron, with haem-iron being 2-3 times more readily absorbed than non-haem iron. Haem iron is found only in animal products and constitutes approximately 40% of the iron in these foods. Non-haem iron is present in plant products; such as green leafy vegetables, legumes and nuts as well as wholegrain breads and cereals; including iron-fortified products. Although non-haem iron is widely distributed in foods, absorption of this iron is very much influenced by other dietary components.

Major dietary sources of iron

FOOD	IRON (mg per serve)	Serving size
Lamb (lean, cooked)	5.4	100g
Beef (lean, cooked)	3.4-3.7	100g
Pork (lean, cooked)	1.5	100g
Chicken (lean, cooked)	0.8-1.2	100g
Fish	0.8-1.2	100g eg ½ cup salmon
Egg	0.9	55g
Green leafy vegetables	0.8-3.2	100g eg ½ cup broccoli
Iron fortified breakfast cereals	3.0	30g eg 2 whole wheat biscuits
Legumes	2.5	125g eg 2/3 cup lentils
Tofu, firm	2.9	100g
Nuts	2.5	50g eg 25 cashews
Dried apricots	1.6	50g eg 10 halves
Seeds	0.7	15g eg 1 tbsp sunflower seeds

Strategies for enhancing the absorption of non-haem iron include the use, as well as the avoidance of, certain combinations of foods.

To ***enhance*** the absorption of the iron in foods we can

- Add haem iron foods, such as a small quantity of lean beef or lamb, to a salad, sandwich or stir-fry. A large quantity of meat is not essential; it is more important to have a frequent consumption.
- Consume vitamin C containing foods with meals. For example add some fresh fruit to your breakfast cereal; some tomato on your wholegrain bread sandwich or some capsicum in your stir-fry.

It is also important to avoid certain food components, or combinations of dietary substances, which ***reduce*** the ability of the body to absorb iron.

- Tea, coffee and red wine are best consumed away from meal times as the tannins and polyphenols present bind to iron.
- Excessive fibre, and in particular wheat bran added to your breakfast cereal, is not recommended as it will prevent iron absorption.
- 'Phytates' present in legumes and wholegrains and 'oxalates' in silverbeet bind with iron to prevent much of the iron's absorption. Vitamin C foods in the same meal will however oppose this effect to some degree.
- Be aware that consuming large amounts of dietary calcium or calcium supplements with iron or iron supplements will impair the absorption of each. It is recommended to take iron and calcium supplements at separate times of the day.

SUPPLEMENTATION

Iron supplements are **only** to be taken on recommendation from a doctor who has performed blood tests and has investigated other more serious causes of low iron. It does take some time to recover depleted iron stores and full recovery of iron stores in anaemia can take 2 to 3 years through diet alone; or many months with supplementation. Even if a supplement is being taken it is important to optimise your dietary intake also.

If your iron levels are low, remember it is the combinations of the foods you consume and the frequency of your iron consumption that is most important, and not just the need to eat a huge steak!