

Strong as iron

Toddlers need high levels of iron in order to achieve optimum health and development

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Iron is an essential nutrient for the normal development of infants and toddlers, with many studies highlighting an association between anaemia in early life and poor neuro-cognitive development. This is a cause for concern as Irish research has found that 50% of two year olds are iron deficient, with nearly 10% being anaemic (Hb <110g/L). Iron deficiency anaemia in early childhood is associated with significantly poorer school performance at age 11-14 years.

During infancy and early childhood, iron requirements are equivalent to eight times that of an adult male (per kg of body weight). It can be very difficult to meet this target and, for that reason, particular attention should be paid to the

weaning diet, both the drinks and solid foods offered.

Toddler iron requirements

Infants are born with enough iron stores to last approximately six months. Around this time, weaning is established and a variety of solid foods are introduced to the diet. By the age of one year, a toddler is relying in full on their dietary intake – both solid foods and milk – to provide all of their daily iron needs.

A toddler needs 8mg of iron per day but 80% of Irish toddlers are not achieving that target.

So what should a toddler be eating and drinking to ensure a good iron intake?

- Balanced diet including iron rich foods
- Vitamin C to improve iron absorption

- Avoid tea!
- Appropriate amount and type of milk drink
- Go for a rainbow diet.

Balanced diet including iron rich foods

A toddler should be offered a wide range of foods to help ensure that no important nutrients are missing – the wider the variety of foods, the less chance there is of nutrient deficiencies. When it comes to iron, high iron foods must be included every day.

These include:

- Meat – beef, pork, lamb and chicken
- Fish – darker oily fish contain more iron than white fish
- Eggs
- Fortified breakfast cereals

- Dark green leafy vegetables (broccoli, spinach, cabbage)
- Dried fruit (raisins, prunes, apricots)
- Baked beans
- Wholemeal bread – Has approximately twice as much iron as white bread. Including these foods in meals and at snack times (box of raisins, bowl of breakfast cereal, wholemeal bread sandwich, liver pate on toast) will help to boost iron intakes.

Vitamin C to improve iron absorption

The best iron sources are animal foods (meat and meat products, eggs, fish) as they contain highly bioavailable iron (haem iron) which is more effectively absorbed by the body, in fact haem iron is absorbed up to seven times more easily than that in cereals, fruit and vegetables. Plant based foods contain a less bioavailable form of iron (non-haem iron).

The absorption of non-haem iron can be improved by the presence of vitamin C as it helps the body to access this less available mineral.

A food or drink containing vitamin C should be offered with a meal or snack containing non-haem iron. Examples include:

- Baked beans on toast with a glass of diluted fruit juice
- Fortified breakfast cereal with chopped strawberries
- Wholemeal toast with a small glass of diluted fruit juice.

The richest sources of vitamin C include oranges, kiwis, lemons, broccoli, peppers, peas, potatoes, blackcurrants, tomatoes and unsweetened fruit juice.

Fruit juice should be limited to meal-times and diluted as it can damage teeth and reduce appetite if consumption is too high.

Tea is not for toddlers

It may seem obvious but it is worth highlighting that tea and coffee are not suitable drinks for toddlers. They contain tannins which bind with iron in the intestinal tract and reduce its absorption.

A 2006 survey looking at one day in the diet of 100 Irish toddlers found that 12% were given tea as a main drink that day. Toddlers should drink up to six cups of fluid per day made up of water, milk and diluted fruit juice.

Appropriate amount and type of milk drink

Toddlers should drink no more than 600-700ml (just over a pint) of cow's milk per day. Over-reliance on cow's milk is a major risk factor for iron deficiency in toddlers, as is the early introduction of cow's milk as a main drink.

Tips to ensure good iron intake for toddlers

- Provide a balanced diet including iron rich foods
- Include sources of vitamin C with meals to improve iron absorption, eg:
 - Baked beans on toast with a glass of diluted fruit juice
 - Fortified breakfast cereal with chopped strawberries
 - Wholemeal toast with a small glass of diluted fruit juice
- Avoid tea
- Provide the appropriate amount and type of milk drink
- Go for a rainbow diet

The Food Safety Authority of Ireland recommends that whole cow's milk is not suitable as a main drink until one year of age as it is too high in protein and sodium and contains low levels of key vitamins and minerals such as iron and vitamin D.

Breastmilk contains only 0.3-1.0mg of iron per litre but has a high bioavailability of about 50%. In fact more iron is absorbed from breastmilk than from any other food or drink. However, by the age of one year, only a small percentage of toddlers are still receiving breastmilk.

Infant milk formulae and specialised toddler milk have a higher iron content to compensate for their lower availability compared to breastmilk. Both of these contain much more iron than cow's milk, which is very low in iron.

Over two-thirds of the toddlers achieving their iron requirements in the 2006 dietary survey were taking an iron-fortified milk that day, suggesting that the use of a toddler milk can make an important contribution to the iron content of the diet.

Go for a rainbow diet

Another at-risk group are those toddlers eating a 'beige' diet – lots of cow's milk, white bread, yogurt, plain pasta and rice and 'golden' fried foods (chips, nuggets and waffles). Such a diet will be very low in iron and a range of other vitamins.

Parents should be encouraged to introduce a 'rainbow' of foods to improve the vitamin and mineral intake.

For these toddlers, an iron fortified toddler milk will increase the iron and vitamin intake while the poor diet is being addressed.

A GP may also recommend an iron supplement in cases where anaemia is diagnosed.

Advice for parents

Encourage parents to use the food pyramid when choosing foods for their toddler, paying particular attention to the iron rich foods and the good sources of vitamin C.

A look at the 'Iron Calculator' available on www.feedingforlife.ie (a website provided by Cow & Gate) will allow a quick check of average iron intakes to be carried out, highlighting the most common sources of iron in the diet.

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Resources

1. Dunne T, Farrell P, Kelly V. Feed your child well – A handbook for parents in Ireland. The Children's Hospital, Temple Street, Dublin 1
2. Healthy Eating for children. Factsheet – Paediatric Interest Group of the INDI. www.indi.ie
3. Food Safety Authority of Ireland. Recommendations for a National Infant Feeding Policy, 1999
4. Freeman VE, Mulder J, Hoy HMV, Gibney MJ. A longitudinal study of iron status in children at 12, 24 and 36 months. Public Health Nutrition 1998 Jun; 1(2): 93-101
5. Khan K. Iron deficiency in infants and young children. Nutritionwise. Eireann Healthcare Publications

